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UNIVERSITY OF ALBERTA

PUBLIC-SECTOR UNIONS:
THE CASE OF THE ALBERTA TEACHERS' ASSOCIATION

BY

ALEXANDER ZENON KONDRA ©

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements for the degree of DOCTOR OF PHILOSOPHY.

IN

INDUSTRIAL RELATIONS

FACULTY OF BUSINESS

EDMONTON, ALBERTA
SPRING, 1995

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UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommended to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled PUBLIC-SECTOR UNIONS: THE CASE OF THE ALBERTA TEACHERS' ASSOCIATION submitted by ALEXANDER ZENON KONDRA in partial fulfillment of the requirements for the degree of DOCTOR OF PHILOSOPHY in INDUSTRIAL RELATIONS.

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January 3, 1995

To my family. Without their immense support this would not have been possible.

Public-sector unions continue to play a major role in labour relations in North America. Despite this fact, there is little consensus about how wage increases are determined in such settings. Further, there is not total consensus on whether or not collective bargaining by public-sector workers is an appropriate method for their representation . This study attempts to identify those factors that have influenced organized teacher pay in Alberta and to identify any possible constraints on teacher wage increases. Although inflation appears to be a primary driver of teachers' wage increases, there is increasing differentiation among the school boards indicating that a paradigm shift may have occurred sometime in the mid 1980s. Although teachers may be considered to be in a favourable collective bargaining position as they have a legislated monopoly over a public good, they have not been willing and/or able to exploit this situation for large gains. While their average pay scales have not exceeded inflation, they do not appear to have suffered the loss of real earnings that the population as a whole has. This may be changing as the Alberta government has cut funding to school boards by the equivalent of five percent of their wage budget. Some of the school boards have been able to exact wage cuts in order to make up for this loss of funding. Overall, this study concludes that the Alberta Teachers' Association has been an effective method for representation and the ATA has not used their position irresponsibly.

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I. Introduction

With the growth of private-sector collective bargaining in the 1930s came an explosion of literature on the topic that continues to grow rapidly today. In contrast, the growth of public-sector collective bargaining, and the associated literature, has been much more recent, as wide-spread public-sector collective bargaining did not take roots until the mid-1960s in North America (Katz and Kochan, 1992; Ponak and Thompson, 1989). As a result, theories about public-sector collective bargaining are not necessarily as clearly developed, which has been partly due to the debate as to whether or not many of the standard assumptions about private-sector collective bargaining apply to public-sector models of collective bargaining (Burton and Krider, 1970; Wellington and Winter, 1969, 1970; Williams, 1973). This may be particularly true where parallel competitive private-sector labour markets do not really exist due to the near total governmental monopoly over certain services such as policing, fire protection, and education (Annable, 1974; Carlsson and Robinson, 1969; Fogel and Lewin, 1974) or where compulsory interest arbitration is used to impose collective agreements, if necessary.

Aiding the complexity is the vast number of employee work groups that are publicly employed, the fact that public servants in Canada and the United States are employed under a variety of federal and state/provincial laws, and the competing roles of government (Kochan and Katz, 1988; Ponak and Thompson, 1989).[1] As a result, the material circumstances affecting public-sector collective bargaining may differ substantially, and the portability of theories and methods among public-sector work groups is in some question. This leads to a paucity of consensus on theory and methodology, thereby leaving many questions largely unanswered. Can public-sector workers extract larger wage increases than workers as a whole? Are public employees that hold a monopoly on services and collectively bargain able to hold the public purse to "ransom" through the withdrawal of services? Do general market conditions play a role in the wage determination of public employees? Do higher levels of governments influence or control wage increases through their grant structures? Are public employees compensated for productivity increases? Are there any resource constraints on wages, and if so what are they? The answers to these and many related questions may have serious public policy implications. This is especially true as public-sector unions appear to be well entrenched and very strong, while in stark contrast their private-sector counterparts seem to be faring far less well (Dion and Hebert, 1989; Kochan and Katz, 1988).

---

[1] Government roles include: (1) custodian of the public interest, (2) a major employer, (3) regulator of the system, and (4) dispute resolution (e.g., appointing mediators or imposing agreements).

In order to empirically tackle these questions and problems, one well defined group of public servants who bargain collectively is studied. This study focuses on unionized teachers in Alberta, as represented by the Alberta Teachers' Association (ATA). Alberta teachers are an interesting group of public employees for at least three reasons. The first is the fact that wages consume at least half of the budgets of elementary and secondary education, not including ever expanding benefit packages, making wages a serious issue in the budget determination process (Denney, 1977; Kasper, 1970; Thornton, 1971). The second is the fact that in Alberta, each municipal district has a Board of School Trustees which has had the power to levy taxes on the property tax base of the municipality. This somewhat insulates teachers from the common problem of the diversion of municipal resources from one worker group to another as each group vies for a larger piece of total municipal resources (Benecki, 1978; Valletta, 1989). For example, in the United States teachers must often compete with other employee groups for resources. The third is the fact that in Alberta, teachers collectively bargain within a predominantly private-sector framework under the terms of the Labour Relations Code, which means that they can engage in lawful work stoppages.

The purpose of this study is to investigate the prevailing theories of wage determination in public-sector teaching, assess such theories, develop a sound methodology, and develop and test a more comprehensive theory of wage determination in the public-sector. One goal is to discuss and develop theories about wage determination in the public-sector under a private-sector bargaining model and develop a methodology that will accurately reflect wage determination in this sector. Another is to attempt to discern any changes in the determinants of teacher pay and identify possible reasons for such a change (i.e., identify any paradigm shifts and the reasons for it). This is attempted by trying to tie bargaining outcomes to rational determinants of teacher pay such as local and provincial economic conditions as well to find an indication of constraints on public-sector collective bargaining. In light of the findings, a discussion of the appropriateness of current public sector collective bargaining structures is undertaken, an important but under-discussed issue (Steiber, 1967; Williams, 1973).

Unlike previous studies, a longitudinal study of many school districts under a constant institutional regime should help provide long term generalizability and increase the homogeneity of the sample, thereby reducing noise from uncontrolled for variables, potentially lending greater credibility to results. These results may also provide some insight into the potential consequences of proposed changes to educational funding on the wage rates of teachers and even possibly the structure of collective bargaining for Alberta's public-sector teachers.

II. The Role of Public-Sector Unions

Why study public-sector unions?

> In recent years, collective bargaining for workers in the public and parapublic-sectors has become a major topic in the field of industrial relations. It is of great concern to policy-makers, public servants, administrators, academics, journalists, and, perhaps most importantly, to the public at large (Craig, 1990: 228).

Couple this with Kochan and Katz's (1988: 434) pronouncements, and there is still a lot of room for research into public-sector collective bargaining:

> none of the early forecasters foresaw the shift in political and economic fortunes of public-sector employees and employers that occurred as the political economy of public employee bargaining tightened in the mid-1970s. Based on the dubious track record of the earlier forecasts, any efforts to generalize about the environment for collective bargaining should be viewed with extreme caution, if not skepticism.

The latter quote refers to a paradigm shift in the 1970s in the U.S. that pushed public-sector unions into political disfavor (Kochan and Katz, 1988). The U.S. trend of the 1970s may have shifted again as governments look for money for education and police protection. Developments observed during the 1970s in the U.S. may slowly come to Canada, which would be consistent with Troy's (1990) belief that Canada follows U.S. developments rather closely but with a lag of up to a generation. In Canada, such a **paradigm shift** may be coming to fruition as governments at all levels attempt to deal with deficit reduction and debt control. It is clear that cyclical political fortunes play a large role in public-sector collective bargaining outcomes and may influence any analysis.

There is also the related issue of the appropriateness of current public-sector collective bargaining structures:

> it is fair to say that we have yet to come up with the appropriate public sector labour relations solution and one must wonder if continued preoccupation with issues and problems represents the most appropriate direction in our subsequent study and research efforts in this challenging field (Williams, 1973: 18).

Although this quote is dated, there has been little movement in the structures of public-sector collective bargaining so there remains a legitimate question: what, if any, joint decision making process should public-sector employees be allowed to participate in, and is the withdrawal of services by government employees a legitimate method for said employees to bring about a collective agreement? A rational evaluation of public-sector collective bargaining outcomes provides a basis upon which to begin a discussion of these issues.

(1) Public-Sector Bargaining History

North American public-sector collective bargaining began during the 1960s (Kochan and Katz, 1988; Ponak and Thompson, 1989) but was not universally touted as a positive development. Many fears were expressed over the role and influence that large public-sector unions could have over public policy and spending. Wellington and Winter (1969) began the academic debate over the appropriateness of collective bargaining for public-sector employees by coming out against a collective voice for employees in the public-sector.

Wellington and Winter identified four compelling reasons for union representation in the private-sector and discussed the applicability of these factors to public-sector collective bargaining. The first reason they identified in favour of collective bargaining is that collective bargaining is a good way to achieve industrial peace. The presence of collective bargaining provides an organized forum in which to encourage dialogue between two parties who often share very divergent viewpoints. It is felt that if a meaningful dialogue is created by the two parties, the chances of coming to a consensus with regards to the terms and conditions of employment is greatly increased.[2] If the only manner for workers to express their displeasure with working conditions is to strike or to look for alternate employment, the level of lost production would undoubtedly be great either from work stoppages or from high turnover. Instead of using raw power, an open dialogue may solve problems peaceably allowing the company to continue production and workers to continue to draw a wage. Both parties can gain from mutual agreement, and in the case of the public service, the public continues to receive an often essential service.

The North American development of the legal frameworks in which collective bargaining takes place illustrates the desire that collective bargaining should foster industrial peace and stability. For example, prior to the advent of modern union certification procedures, recognition strikes were not uncommon, and such strikes seriously disrupted industrial production and spurred the development of the certification process. A further development was the barring of strikes during the lifetime of a collective agreement. This was done to increase the stability of the employment relationship and aided the development of procedures to deal with disputes during the lifetime of an agreement (grievance procedures).

---

[2] This is evidenced by the fact that less than 10% of collective agreement negotiations result in a work stoppage (Craig, 1990; Kochan and Katz, 1988).

The second reason identified by Wellington and Winter (1969) for the existence of collective bargaining is that it is a mechanism for achieving industrial democracy. In other words, it allows workers to participate in the governance of the workplace. Prior to collective bargaining and minimum standards laws (e.g., minimum wage and occupational health and safety) the power of the employer was unlimited and could be exercised in an arbitrary fashion.[3] This arbitrary exercise of power diminished the job security of the individual and had a large, negative social and economic impact on the workforce. Abusive conditions were often a catalyst for work stoppages and clearing these problems up was thought to increase the level of industrial peace.

The third reason is that collective bargaining allows for groups of workers to participate in the political arena in a meaningful way. This point is becoming even more pertinent as the government becomes increasingly involved in our daily lives and businesses become larger and supranational. In the absence of any organized manner for the middle and lower classes to exert their political will, the political process has the potential to be dominated (some might say highjacked) by business groups that have the resources to create organized lobbies and donate substantial sums of money towards election campaigns. This would be a great subversion of the democratic process as business groups represent a minority of the population. Having unions represent workers within the political arena has the potential to place a countervailing weight on the interests of big business, potentially a great benefit to society.[4]

The last and probably most compelling reason for the existence of collective bargaining is that collective bargaining provides a countervailing power to any monopsonistic power that the employer may have.[5] It has long been argued that large employers are not subject to the discipline of the free market with regards to labour but are large enough to dominate and subvert the free market in order to reduce wages and increase profits. As a result, there is a large discrepancy in the distribution of bargaining power. This situation may not allow for an equitable distribution of the value added to goods and services through labour. Such unfairness, real or perceived, also detracts from industrial peace. Even if monopsony power does not exist, the labour market is far from perfect and the withdrawal of services by any single individual, with the exception of certain strategic workers, will have a minimal effect on the operation of a firm. By almost anyone's definition there is an inequity of bargaining power.

---

[3] One of the most extreme examples of the abusive possibilities of employers occurred in the longshoring industry (Fisher and Kondra, 1993). Workers were hired on a daily basis which allowed those charged with the hiring of men to extort kickbacks in a variety of forms.

[4] This presumes that the unions themselves are truly representative of the interests of their members and the working class, which might not always be the case.

[5] It is interesting to note that Wellington and Winter (1969) and Burton and Krider (1970), Wellington and Winter's contemporary critics, discount this consideration with regards to public sector employers, as they feel that public sector employers rarely have a monopsony in any given labour market.

From a purely egalitarian point of view, it is hard to discount these factors when discussing whether or not public employees should be represented in a traditional collective bargaining manner. The questions become, though, do public-sector employees suffer from the same workplace problems as private-sector employees, are the solutions to the problems in the private-sector the best solutions for the public-sector, and what, if any, are the constraints on wages and working conditions for public-sector employees?[6]

Undoubtedly public-sector workers can suffer from similar problems to those suffered by private-sector workers, although it is possible for government to exercise its employment power in an egalitarian manner. The lack of a profit motive and intense public and media scrutiny may encourage such behaviour. Alternate mechanisms are available for worker representation through such methods as establishing adequate administrative procedures for decision making (Williams, 1973). This may be done through joint boards to make decisions on such matters of hiring and firing and setting

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However in Canada, monopsony power may be a particularly important consideration as governments dominate so many labour markets. Obvious examples include firefighters, police officers, nurses, and teachers.

[6] The ultimate constraint on private sector unions is the viability of the firm, and this is partially a function of the cost of labour.

wages. Although it can be argued that administering the workplace in this manner may allow the government to dominate the decision making process, the sovereign nature of most governments provide them with the right to dictate the terms and conditions of employment if they so do desire.[7] Such a right is demonstrated where the government, by legislative fiat, enforces the civil service merit principle and precludes some, or all, workers from collectively bargaining over certain issues (e.g., promotions and job classifications -- Fisher and Williams, 1989). This right continues to exist regardless of any previous commitments a government has made (Jones and DeVillars, 1985).[8] The largest constraint on the manner in which governments treat their employees is political: will the electorate feel that the government is dealing with its employees in a high-handed manner, and, if so, is it sufficient reason to remove these individuals from office?

(2) Marshall's Conditions

Probably the greatest potential problem that exists with regards to the transplanting of private-sector union principles has to do with constraints on unions and bargaining outcomes within the collective bargaining process. Marshall (1920) posited four conditions that indicate high union bargaining power. These conditions are

(1) labour cannot be easily replaced by other labour or capital;

(2) demand for the product is price inelastic;

(3) when the ratio of labour costs to total costs is small; and

---

[7] Of course the exception is municipal governments in North America, as municipal governments are not sovereign. The rights and responsibilities of municipal governments generally exist at the pleasure of the province (Canada) or the state (United States).

[8] This right exists for both federal and state/provincial governments as they are sovereign over that which they have jurisdiction as defined in each country's constitution.

(4) when the supply of non-labour factors of production
is price inelastic.

It is difficult to tell from these four conditions whether or not public-sector unions have any real advantage versus their private-sector counterparts.

The first condition clearly falls in favour of public-sector unions, particularly in those areas where the public-sector has a very clear monopoly on the supply of services (i.e. policing, fire protection, nursing, and teaching). Most of these services are highly labour-intensive, and there is little opportunity to substitute capital for labour. In addition, these workforces are particularly large and therefore hard to replace in the event of a withdrawal of service. Workers must in many cases be certified by a governing board, reducing potential supply, or public-sector unions are assigned a monopoly by government under statute.[9]

The second factor also works in favour of public-sector unions. Many of the services provided by government are provided by government for the very fact that they are deemed essential by the public at large. Due to the fact that they are considered essential services, they are rather price-inelastic, as the public is willing to pay a large price for these services, especially as there are no realistic alternatives for individuals. Probably the best example of this is police services. The loss of police services due to strike action has had a devastating effect on cities in North America (Kochan and Katz, 1988). The result is that many governments are much more willing to acquiesce to wage demands rather than suffer the consequences of the withdrawal of services.

The third and fourth factors place public-sector unions at a disadvantage. The third factor is more commonly referred to as the importance of being unimportant. Where most of the costs of production are associated with capital, collective bargaining power is often very high. An increase in labour costs raises the final product price by a very small amount, and during a work stoppage, capital costs continue to be incurred.[10] A prime example of an industry with a high capital to labour cost ratio is the shipping/longshoring industry (Fisher and Kondra, 1993). The ratio of labour costs to total costs in public employment usually ranges from a minimum of half of total costs upwards to ninety percent of total costs (Kochan and Katz, 1988), indicating that wage considerations are an important consideration for public-sector employers. This third factor tends to discount the fourth factor as coming into play. As material costs are usually small in the public-sector (relative to labour costs), they are generally less important.

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[9] As will be discussed, the Alberta Teachers' Association has a statutory monopoly over the provision of teachers to publicly funded school boards.

(3) Other Factors

Several other factors may reduce the potential constraints on public-sector collective bargaining outcomes. These include:

(1) long time spans between elections;
(2) pressures from special interest groups;
(3) no direct ability of citizens to limit tax increases or government spending;
(4) deficit spending; and
(5) a taxpayer's inability to opt out of government programs with compensation.

With three to five years between elections and due to the fact that interim accountability generally does not exist in Canada, elected officials may acquiesce to union demands early in their mandate in the name of political expediency and possibly due to pressures from special interest groups. Unlike many of the states in the United States, Canadian federal and provincial governments cannot be limited by any citizen initiatives with regard to tax increases or spending thereby reducing the ability of citizens to have any direct and immediate impact on taxation levels or government spending.[11] Deficit spending allows governments to off-load costs of government services to future generations and tends to discount the argument that the taxpayer takes the role of the consumer in a public-sector bargaining setting. Deficit spending effectively allows the bundle of government services to be sold at a discount and reduces the need for individuals to make any choice with regards to desired levels of taxation versus desired levels of government services.[12]

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[10] A middle ground is where labour costs are a small portion of total costs, while material costs make up most of the remainder of the cost of production. An increase in wages raises the final product cost by a small amount, but during a work stoppage, the employer does not continue to incur material costs.

A lack of competition also leaves most individuals with no alternatives to government services, and by isolating these workers, detracts from or erodes any frame of reference upon which to compare wages and working conditions. Many government services are essential and individuals are usually unable to substitute non-government services without incurring the full cost of the service again.[13] Many individuals do not have the luxury of making this choice, causing them to be captive consumers of government services. If constraints on the power of public-sector unionized workers are insufficient, it is a valid question to ask whether alternate methods of representation should be considered, or in the extreme whether representation should be eliminated in its entirety (Williams, 1973).

Of course government does have the ultimate countervailing power. As the administrator of the system, government can make the rules and change them to suit its needs. This seems to be occurring more often as time progresses and is exemplified by the increasing occurrence of government imposed wage freezes (Thompson and Ponak, 1992). Another factor is the monopsony power that governments hold with regards to many job markets. If constraint mechanisms fail, there is always the possibility that unions will not exercise their power in its entirety to maximize their gains, but they may use their collective power to achieve equitable gains.[14] An appearance of the abuse of power on the part of public-sector unions may galvanize public opinion clearly against such a union thereby allowing the government to make the "popular decision" to implement "anti-union" policies such as wage freezes, compulsory interest arbitration, or, in the extreme, union decertification.

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[11] It must be said that the only spending discipline that may be placed on Canadian governments is through the financial markets and through the electoral process. If governments are unable to market their bond issues, their source of funds dries up. If this occurs budgets must be balanced, as occurred in New Zealand in the 1980s.

[12] It should also be noted that discounting the bundle of government services from their true costs may also inflate the demand for these services.

[13] The taxpayer has already paid for (some or all) government services through his/her taxes.

This study is concerned with how public-sector bargaining has affected bargaining outcomes and attempts to tie bargaining outcomes to rational determinants of teacher pay such as local and provincial economic conditions as well to find an indication of constraints on public-sector collective bargaining. This is an extremely important task as the empirical evidence to date has been relatively limited, particularly with regards to these issues over time. There also appears to be little consensus on how public-sector unions, especially those with the right to strike, have influenced wage outcomes (Kochan and Katz, 1988). It is also extremely difficult and highly subjective to judge whether or not bargaining outcomes have been equitable. If wage gains have been driven by many of the factors that one would expect them to be driven by (e.g., productivity, ability to pay, or macro-economic indicators), it would be easier to declare that bargaining outcomes have been equitable. If on the other hand bargaining outcomes are not determined by such factors, and wage increases have outstripped those of the general population and/or inflation, one may be able to say that public-sector workers have been able to exploit their position for their own gains at the expense of the taxpayer. Also if wage gains are not determined by rational factors that one would expect and wage gains have fallen behind those of the general population and/or inflation, it may say that public-sector workers are still disadvantaged vis-a-vis their private-sector counterparts.

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[14] One could argue that governments do not usually exercise their ultimate (legislative) power and therefore it is possible that unions do not exercise the their full bargaining power.

The question of the role of collective bargaining in the public-sector is more than likely coming to the forefront of the political arena. Because of the increasingly insolvent nature of Canadian governments at both the federal and provincial level, a serious reexamination of all government spending is likely to be undertaken in the coming years (Boothe and Reid, 1993). The deficit and debt were serious election issues in the provincial election in Alberta and the Federal election, both taking place in 1993. The results of the two elections were somewhat mixed. The Progressive Conservative Party in Alberta, led by Ralph Klein, ran a successful campaign that promised a balanced budget in four years, a major plank in his campaign (Edmonton Journal, January 18, 1994). With the Alberta deficit running at approximately 18% of total government spending, serious cutbacks in government spending and/or large increases in taxes would need to be undertaken to balance the provincial budget, and the choice seems to have been made that the Alberta budget will be balanced primarily through cuts in spending.

During the Federal election, the Liberals, led by Jean Crietien, promised to reduce the annual deficit from what was believed to be 5% of the gross domestic product (GDP) to 3% of GDP. After gaining power, the Liberals discovered that the deficit for the 1992/93 fiscal year would easily exceed 6% of GDP, lending a sense of urgency to the Liberal's deficit cutting goals. Paul Martin, the federal finance minister, stated in 1994 that no "sacred cows" would be above scrutiny in his quest to reduce the deficit. One area that is a possible target for the Federal government to cut is equalization payments to the provinces. This has worried many provinces about the state of their finances if they continue to lose federal government support. From Alberta's perspective, being labeled as a "have" province, it does not receive equalization payments from the Federal government, eliminating the worry that these will be cut, thereby further exaggerating the existing financial exigencies. In addition, the Federal and provincial governments have cost shared social programs, and the federal government has reduced its share of spending in these areas for the "have" provinces (Alberta, British Columbia, and Ontario -- Boothe and Reid, 1993).

In Alberta, total spending for grade school education from both municipal and Provincial sources is estimated to exceed $2.6 billion for the 1992/93 school year, with over half of that funding provided by the Provincial government (Department of Education, 1993). As total spending for the Province of Alberta in 1993/94 was approximately $14 billion, it can be seen that education is a significant portion of that spending, and in turn **wages and benefits comprised approximately 65% of total educational spending** (School Business Administration Services, 1993). As the financial exigencies become increasingly problematic, the provincial government has been eyeing provincial and MUSH (municipal, university, school and hospital) sector wages and spending. This development may be a parallel to the paradigm shift and taxpayers' revolt that was experienced in the U.S. in the mid-1970s with its negative effect on public-sector collective bargaining (Kochan and Katz, 1988). The U.S. taxpayer revolt was facilitated by the fact that in many states taxpayers, through direct democracy, have the ability to alter state constitutions or force legal initiatives to limit taxes and force balanced budgets. In Canada, taxpayers lack any real ability to directly limit spending or taxation outside of the normal electoral process. As a result, until very recently, Canadian provincial and federal politicians have not seriously considered spending reductions and reduced deficits as issues upon which they could run and win an election campaign, resulting in an almost two decade delay versus the U.S. in the development of this trend. Three of the four national parties in the 1993 federal election had deficit reduction or elimination as a major plank in their election campaign, including the Liberals who won a majority government, indicating that the population as a whole may be reconsidering the level of government spending in Canada.

A taxpayer backlash, or paradigm shift, against public-sector wages would be consistent with developments in the United States in the 1970's (Kochan and Katz, 1988) and with the belief of Troy (1990) that Canadian and U.S. developments are highly correlated in the industrial relations arena with the exception that developments in Canada lag those of the United States by anywhere up to a generation. If this public backlash against public-sector unions materializes, it may also be transitory. There is some evidence that the U.S. backlash against pubic-sector spending is on the wane and there has been a recent paradigm shift favourable to public-sector unions. There are increasing numbers of individuals calling for increased taxation to provide more government services, particularly in the area of public education and police protection (Kochan and Katz, 1988). The Provincial Government's attempt to balance the budget in Alberta by 1997 may force voters in the province to reveal their preferences with regard to the levels of government services they are willing to pay for as Albertans, due to deficit spending, are not currently paying for the full cost of the services they receive.[15]

Major North American academic journals also appear to be silent on the role of public-sector collective bargaining. The previous six years of issues of four major industrial relations journals were checked, and the journals have been remarkably mute on public sector pay and representation issues despite the lack of consensus in the area. The journals checked include the Journal of Labor Research, Industrial Relations, Industrial and Labor Relations Review, and Relations Industrilles. Part of the purpose of this study is to look at rational indicators to determine if there is some connection with increases in teacher pay. Although this study will not provide a definitive answer as to whether or not collective bargaining has been an effective tool for employee representation in the wage arena, it will provide a meaningful basis for discussion.

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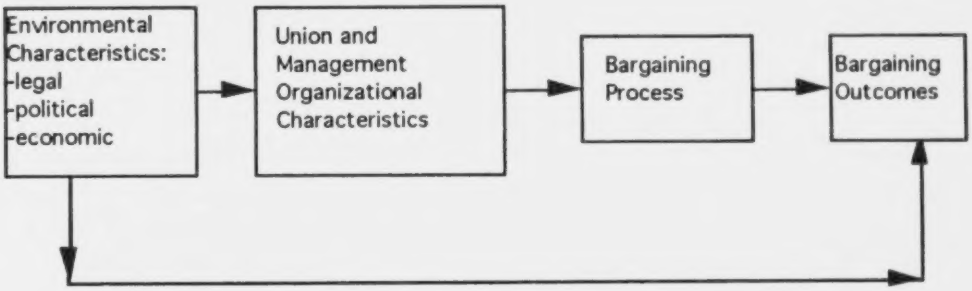
[15] It is interesting to note that the Federal government is now generating an operational surplus to cover part of the interest on the accumulated debt. In other words, at the Federal level Canadians are now receiving less service than they are paying for.

This discussion is particularly timely given the recent emphasis of governments in Canada on spending issues and it is clear that the role of public-sector unions under these conditions (if there is to be one) has not yet been answered.

III. Early Empirical Investigations

Previous work on determinants of teachers' pay primarily focused on institutional (legal) and economic factors and consisted of simple cross-sectional analysis. Studies used a framework similar to that employed by Kochan and Wheeler (1975), an often cited work on determinants of municipal public-sector pay, despite the fact that early empirical investigations preceded their work. While a variety of theories and methods have been tested, little change has occurred over time to the basic theories, and empirical results have been highly mixed.

Kochan and Wheeler's (1975) model looks as follows:


Environmental Characteristics:
-legal
-political
-economic
Union and Management Organizational Characteristics
Bargaining Process
Bargaining Outcomes

The causality arrow from environmental characteristics directly to bargaining outcomes is "...shown to suggest that the environment has both a direct impact on outcomes and an indirect impact through its effect on the characteristics of the parties and the bargaining process" (Kochan and Wheeler, 1975: 51). Although this framework is relatively simple, it appears to capture the major variables that have been associated with public-sector collective bargaining outcomes. This framework is useful to keep in mind while reading the literature survey.

The public-sector research that follows has controlled for some of the factors in the model through homogeneity of sample, while others have attempted to test how variations in these factors have affected bargaining outcomes. Almost all have failed to measure some of these variables or do a reasonable job to control for them through homogeneity of sample. What appears to be the first scholarly publication on determinants of public-sector teacher wages in North America was authored by Kasper (1970). It was a cross-sectional study primarily based on published state-wide average salaries for the fifty U.S. states and the District of Columbia (for a total of 51 observations), and supplemented by unpublished reports of the National Education Association (NEA), the American Federation of Teachers (AFT), and by personal mail surveys where incomplete data compelled the researcher to supplement his data base. Both the statewide average salaries for 1967-68 and the arithmetic average for the years 1966-67 and 1967-68 were used to operationalize the dependent variable for the primary analysis. It was felt that using the average of two years of wage data would reduce the random variation in wage rates due to the fact that wage rates are revised by state and local authorities at irregular intervals, partly as a result of variations in the collective bargaining calendar.

At the time the study was done, fewer than one in eight school districts engaged in any form of collective negotiations, "...and as few as three percent of school systems bargain[ed] as equals with teacher representatives" (Kasper, 1970: 60). This was in spite of the fact that on average approximately 38% of teachers in each state were represented by teacher organizations. Representation ranged from "merely allowing a committee of teachers to submit proposals to assist the school board in writing its unilateral policy to more traditional collective bargaining complete with a mutually satisfactory and signed collective agreement" (p. 58). It was found that representation of teachers, primarily by NEA and the AFT, had little (0.5%) to no effect on the wages of teachers--one of the most important findings of the paper.[16] Although this is an important finding within an American context, it has little application to the study at hand, as by law, all teachers in publicly funded institutions in the Alberta must belong

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[16] See Table 3-1 for a summary of common independent variables in Kasper (1970), Landon and Baird (1971), and Thornton (1971).

Table 3-1

Author(s): Year	Kasper 1970		Thornton 1971				Landon & Baird 1971			
Unit of Analysis	State		School District				School District			
Sample	National		National				National			
Sample Size	51		83				136			
Dependent Variable(s)	(1)Mean Salary (2) 2yr Mean		(1) Bach. Min. (2) Bach. Max. (3) Mas. Min. (4) Mas. Max.				Beginning Salary (Full and Sub-Samples)			
	(1)	(2)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Common Independent Variables:										
Ability to Pay	+1	+1					+.5	+2.5	+2.5	+
Collective Bargaining	+	+	+5	+10	+10	+5				
Monopsony Power	+5	+5					+.5	+.5	+.5	+
Local Revenue %	-1	-1					+2.5	+2.5	+	+
Expenditure/Pupil	+1	+1								
Pupil Teacher Ratio			+	-	-	+				
Opportunity Wage			+1	+1	+1	+				
Willingness to Pay							+	-	+10	+10
Enrollment			+1	+	+1	+				
Seniority			+1	+1	+1	+1				
R-squared	0.87	0.90	0.51	0.48	0.57	0.07	0.47	0.51	0.57	0.39
Other significant variable(s):	% State Support Region									

Legend: + positive coefficient
- negative coefficient
If the coefficient is significant, the sign is followed by the level of significance.

Bach.: Bachelor Degree; Mas.: Masters Degree.

to the Alberta Teachers' Association. Nevertheless, Kasper's investigation of other variables that may affect teacher pay may be of use.

Independent variables investigated by Kasper included (1) state per capita income (ability to pay), (2) the extent of urbanization in the state (monopsony power), (3) proportion of total expenditures provided by local governments, (4) proportion of total expenditures provided by state governments, (5) proportion of total expenditures provided by the federal government, (6) total current expenditures per pupil, (7) the relative mix between elementary and secondary teachers, and (8) the existence of collective bargaining. He also employed a regional dummy variable for the western states after preliminary estimates indicated the model underpredicted the salaries in most western states. It was hypothesized that salaries would be positively related to (a) per capita income, (b) extent of urbanization, (c) support from state sources, (d) expenditures per pupil, and (e) the extent of teacher organization. It was also hypothesized that the greater the number of primary teachers, relative to secondary teachers, the lower will be the salary rate in the state due to the belief that primary teachers received less money than secondary teachers.[17]

Ordinary least squares (OLS) results were not significantly affected by alternative specifications of the dependent variable (R^2s were .87 and .90). It was found that teacher salaries were positively and significantly related to state per capita income (ability to pay) and expenditures per pupil (both at the 1% level), while both proportion of funding coming from the state (10% level) and proportion of funding coming from the local level (1% level) were negatively and significantly related to wages. Funding source is a mixed result from a theoretical point of view. Generally it is expected that the more funding that is raised locally, as a percentage of total budget, the higher teacher pay should be. Higher levels of government (i.e., state/provincial and federal) provide money to municipal governments to ensure an adequate level of municipal services across the state/province or the country. Lower teacher pay should result where there is greater reliance on higher levels of government, which often occurs due to a lack of local revenue sources or an unwillingness to put money into local services.[18] Greater reliance on local revenue to meet municipal expenditures is often the result of the ability and willingness of local governments to pay for these services and should result in greater teacher pay. In theory, it is highly contradictory to have coefficients of the same sign on both percentage of total budget from municipal sources and percentage of total budget from state sources.

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[17] Many school districts in the United States have two pay grids, one for primary teachers and another for secondary teachers. This is quite unlike Alberta where pay grids are based on years of service and educational attainment.

Urbanization was found to be negatively related to wages but at a declining rate, perhaps due to the possible monopsony power of school districts. It is believed that teachers in rural states may not have nearby work alternatives and therefore the level of competition for teachers is significantly reduced.[19] It is also possible that urbanization substantially increases spending on other public services such as municipal bus services and garbage pick-up, thereby diverting money away from education (Hettich, 1968). This of course will be a nonissue in Alberta, as each school board has had an independent ability to raise revenue and is only charged with one task: the education of children.[20]

Although the study was interesting, it suffers from an aggregation problem that the author readily admits to (Kasper 1970, 1972). As negotiations take place at the district rather than state level, it would be more appropriate to look at district level wages rather than state level wages. This criticism is echoed by Thornton (1971) and Baird and Landon (1972), who commented on Kasper's (1970) work in their subsequent studies on teacher pay. Estimates could clearly be improved by the employment of micro-level (school district) data as well as time series data (Kasper, 1972). The study also does not control for expanding or contracting population sizes which could affect the distribution of teachers within the pay scales and thereby affect mean salaries independently of many of these variables.

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[18] In the United States, employee groups within the municipality, often including teachers, must compete with each other for resources (Benecki, 1978; Valletta, 1989). Due to the independent standing of school boards in Alberta, such inter-employee group competition does not occur.

[19] Rural states will have geographically large school districts due to low population density. As school districts become geographically larger, nearby work alternatives become fewer and competition for teachers may wane.

[20] School board authority to tax is now under threat (Edmonton Journal, January 19, 1994) and the implications of such a change will be discussed subsequently.

The level of commitment to collective bargaining was not accounted for in the regression analysis, or in other words, Kasper failed to account for differences in union and collective bargaining characteristics. The NEA, for instance, classifies its collective agreements into four categories with only Level IV agreements being what one would consider today to be full and proper collective bargaining (Thornton, 1971).[21] This makes Kasper's categorization of the strength and extent of teacher organization suspect.

Differences in legal and political environments were not controlled for and work has successfully been done relating public-sector pay to legal and political environments. Regarding legal environments, a dearth of dispute resolution procedures may influence negotiated or imposed settlements in each jurisdiction. Similarly, some school boards, depending on the state, have the right to generate revenue through taxation while other school boards are dependent on revenue from the municipality (Perry, 1979; Schmenner, 1973).

With regard to Kasper's (1970) choice of independent variables, regression of salaries on per pupil expenditures is "an example of regressing a dependent variable against itself" (Schmenner, 1973: 83) and may account for the very high R^2s obtained in the regression analyses.[22] This is likely the case because of the large percentage of a school's budget consumed by teacher salaries.

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[21] Differences in the quality of agreements is often a result of differences in the legal framework for municipal employee collective bargaining (Anderson, 1979; Kochan and Wheeler, 1975; Woodbury, 1985). Failure to account for these differences in a cross-sectional study may discount the quality of results.

[22] All studies reviewed in this section that draw a national sample fail to control for differences in fringe benefits and working conditions. Improved working conditions may be traded for lower wage

Landon and Baird's (1971) paper on determinants of teacher pay investigated (1) the ability of the school district to pay, (2) the willingness of the district to pay, and (3) the elasticity of the supply of teachers to the school district (monopsony power). The eight OLS estimates were based on a national cross-sectional sample of 136 school districts for the school year 1966-67. The entire sample was used with and without regional dummy variables, and the sample was divided into three sub-samples based on the size of enrollment in the district (again regressions were run with and without regional dummy variables). The dependent variable was the starting salary for teachers with no prior experience.

Other than the regional dummy variables, four independent variables were tested in the model. Monopsony power of school districts, as measured by the log of the number of school districts in the county containing the district, was felt to represent the elasticity of supply. Due to the checkerboard nature of teacher collective bargaining in the United States, the potential monopsony power of the school districts was considered to be a very important research question (Kasper, 1970; Landon and Baird, 1971; Schmenner, 1973; Thornton, 1973). Monopsony power can be an issue wherever the government is a dominant employer in a job market:

> To the extent that the government sector is often the dominant employer in particular labour markets, governments may utilize their monopsony power to pay lower wage rates than if they behaved competitively ... empirical evidence [suggests] that for at least two elements of the public-sector -- teaching and nursing -- there [is] some evidence of monopsony (Gunderson and Riddell, 1988: 432-3).

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settlements (compensating differentials), and fringe benefits are a substantial part of public employees' compensation packages (Gunderson and Riddell, 1988). Failing to control for wage/none-wage trade-offs may seriously distort findings. Also, many of the criticisms of Kasper's (1970) paper also apply to subsequent studies.

Theory has it that "...city districts which hire a large percentage of the total teachers in the urban area possess and exercise considerable monopsonistic power" (Baird and Landon, 1972: 414).[23] This arises from mobility barriers due to the reluctance of individuals to move from one city to another, the potential to lose seniority and/or pension benefits, and the fact that many teachers were secondary wage earners. Therefore, as the number of school districts in the county increase, the monopsony power of any school district should fall. In six of the eight OLS estimates, the log of school districts in the county was found to be significant at the .005 level, including in both full sample estimates, thereby supporting the monopsony hypothesis (see Table 3-1).

Effective property tax rates were included in the regression analyses as an indication of the willingness to pay for education, with the theory being that the higher the effective property tax rate, the greater is the willingness to pay. Variables included in the OLS estimates to account for ability to pay were per capita county income and the percentage of total school revenues received from local sources. The reason for the inclusion of per capita income is self-evident, and the percentage of locally derived revenue was included because most state equalization payments are meant to supplement the financial resources of poorer regions, indicating that poor regions will both derive greater resources, as a percentage of total resources, from the state and also be unable to pay teachers high wages. Both variables were expected to be positively related to teachers' wages and all the signs in OLS estimates were of the expected sign (positive). Depending on the sample used in the regressions, the variables wavered from not significant at the ten percent level to significant at the 2.5% level, indicating that the regression analysis is sensitive to sample specifications (R^2s varied from .39 to

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[23] To the contrary one may argue that teachers, particularly when they collectively bargain and have strict licensing requirements, have a countervailing monopoly on a public good that has a relatively inelastic demand (Wellington and Winter, 1969). This of course is an enviable position for anyone or any group, and may easily translate into higher prices for that good, in this case teaching services.

.64). As with Kasper's (1970) study, Baird and Landon's (1972) study suffers from a lack of control for differences in the legal and political environments and for differences in union organization. Regressing salaries on tax rates may also be a case of regressing the dependent variable against itself, as salaries (and therefore total spending) can heavily influence the tax rate.

Thornton's (1971) first published work on the determinants of teacher salaries was a cross-sectional study of 83 U.S. school districts in cities with a population of greater than 100,000 people. Cities with populations in excess of 100,000 were chosen in order to maximize the homogeneity of the sample. Initially, Thornton developed a five-equation system (a teacher supply function, a demand function, a negotiation wage premium function, a negotiation strength function, and an excess supply function) and through substitution developed a single reduced form equation to solve for actual wage rate, the dependent variable in his OLS analysis. Initial OLS analysis was done on four key pay rates: AB minimum, AB maximum, AM minimum, and AM maximum. Thornton failed to define these terms but it appears to be the entry rate and top rate for those with bachelor's (AB) and master's degrees (AM).

It was hypothesized that wage rates would be related to quality of education or pupil teacher ratio (negative), the size of the school district (indeterminate), a benchmark salary variable or opportunity wage, which was defined as the average salary in that city or surrounding county (positive), excess supply (negative), and negotiating strength (positive), which was coded as a dummy variable: 1 if there was formal collective bargaining and 0 otherwise.[24] The regression coefficients were generally of the sign expected, with the exception of pupil teacher ratio, but only the negotiation strength (i.e., collective bargaining--two at the 5% level and two at the 10% level), and opportunity wage (three at the 1% level) coefficients were statistically significant. District size had a positive and significant (1%) coefficient for both equations where the dependent variable was defined as the starting salary for teachers (bachelor's and master's).

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[24] Excess demand was defined as the percentage of full time classroom teachers with less-than-standard teaching certificates. This was left undefined and how it relates to demand is unclear.

Pupil teacher ratio was of mixed signs (two each way), and the argument for the sign being negative is unconvincing. One might be easily convinced that the higher the pupil teacher ratio, the more productive the teachers in that district would be, allowing the school district to pay each teacher a higher wage to reflect that productivity. Once again, this study lacks adequate controls for legal and political environments and for union characteristics, a consistent problem for those studies that have drawn their sample from a variety of jurisdictions.

Baird and Landon (1972) quickly replied to Kasper's (1970) and Thornton's (1971) papers.[25] They had three major criticisms of Kasper's (1970) paper: (1) the study used state level data, in spite of the fact that wage determination occurs at the school district level, (2) the use of average state-wide salaries ignored the changing distribution of teachers through the pay scale and ignores the heterogeneity of school districts and the surrounding labor market and cost of living, and (3) the study ignored the structure of the school districts in the state. Their criticism of Thornton's (1971) paper were far more muted and centred around the lack of generalizability of the study, as his sample consisted of only those school districts in large urban areas (greater than 100,00 people), and the fact that he did not control for the nature of the labour market (i.e., the degree of monopsony power of the school district).

Baird and Landon then performed their own regression analyses.[26] Forty-four school districts with enrollment between 25,000 and 50,000 were chosen for the

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[25] At the time of Baird and Landon's (1972) reply, Thornton's (1971) paper was yet unpublished but had been presented at a conference. It was subsequently published in the Quarterly Review of Economics and Statistics (see the footnote on p. 37 of Thornton, 1971).

[26] Please see Table 3-2 for a summary of Baird and Landon (1972), Hall and Carroll (1973), and Thornton (1973).

Table 3-2

Author(s):	Baird & Landon			Hall & Carroll		Thornton			
Year	1972			1973		1973			
Unit of Analysis	School District			School District		School District			
Sample	National			Cook County, Il.		National			
Sample Size	44			118		83			
Dependent Variable(s)	Beginning Salary (3 Coll. Barg. Measures)			Mean Salary (2 Models)		(1) Bach. Min. (2) Bach. Max. (3) Mas. Min. (4) Mas. Max.			
	(1)	(2)	(3)	(1)	(2)	(1)	(2)	(3)	(4)
Independent Variables:									
Ability to Pay	+1	+1	+5	+1	+1				
Collective Bargaining	+1	+5	-	+5	+10	+5	+10	+10	+5
Monopsony Power	+1	+1	+1			+	+	-	-
Local Revenue %	+	+10	+10	+1*	+1*				
Expenditure/Pupil					+				
Pupil Teacher Ratio						+	-	-	+
Opportunity Wage						+1	+1	+1	+
Willingness to Pay	-	-	-	+10					
Enrollment				+1	+1	+1	+	+1	+
Seniority				+10					
R-squared	0.69	0.67	0.64	0.70	0.51	0.56	0.63	0.64	0.58
Other significant variable(s):				% Male					

Legend: + positive coefficient

- negative coefficient

If the coefficient is significant, the sign is followed by the level of significance.

*This was measured as state aid as a percentage of total budget and had a negative coefficient

Bach.: Bachelor Degree; Mas.: Masters Degree.

regression analyses. The dependent variable was the starting salary for teachers with no previous experience and independent variables included: (1) degree of teacher organization (three alternative measures were used in three regressions), (2) willingness to provide revenues (effective property tax rate, percentage of revenues from local sources), (3) ability to provide revenues (per capita income), and (4) a market structure variable (log of number of school districts in the surrounding county--representing monopsony power). The log of school districts was found to be significant (1%--positive) over all three regressions, which supports the competition theory. Per capita income was also found to be positive and significant (two at the 1% level and one at the 5% level) over all three regression analyses. Percent revenue from local sources was found to be significant (positive) at the 10% level in two of the three regressions, while the regression coefficients of the collective bargaining variables were all positive but of mixed significance (.01, .10, and not significant). Although the effective property rate coefficient was insignificant, the coefficient in all three regressions was negative. Intuitively it would seem that the higher the local property tax rate, the greater should be the willingness to pay (Kasper, 1972), which is somewhat contrary to these findings. The R^2s for the three regressions were .64, .67, and .69. The lack of any measures of labour market conditions may be considered a failing of the paper as well as failure to control for the variances in collective bargaining frameworks across the sample.

Thornton (1973) replied quickly with a two page article in Industrial and Labor Relations Review. He felt that the monopsony issue was a serious issue that needed to be investigated. His model specifications were similar to Baird and Landon's (1972) and independent variables included were as follows: (1) negotiation strength of the teachers' organization (a dichotomous variable to indicate whether or not formal collective bargaining occurred), (2) the size of the city school district (monopsony power), (3) the average pupil-teacher ratio, (4) average level of wages in that urban area (opportunity wage), (5) a measure of excess supply and demand, and (6) the natural log of the number of school districts in same county as the observed school district. Four dependent variables were investigated (bachelor-educated teachers' minimum and maximum salary and masters-educated teachers' minimum and maximum salary), and regressions were run with and without the monopsony measure, resulting in eight regressions. The sample was national in scope (U.S.) and consisted of school districts with at least 100,000 population for which data were available (N=83).

The addition of the monopsony variable added nothing to the overall regression results, as the monopsony variables in each of the four regressions had mixed signs (two positive and two negative) and the monopsony variable was not significant in any of the regressions, leaving the R^2s unchanged (.08, .48, .51, and .57). The collective bargaining variable was significant (positive) in all eight regressions at the 10% level or better. Average wage in the urban area was significant (positive) in all regression analyses at the 1% level, except for both regressions on maximum masters' pay. The size of the city school district was positive and significant (1% level) for all four regressions on entry level wages and insignificant otherwise. The excess supply variable and average pupil teacher ratio were not significant in any of the eight regressions and had mixed signs.

Owen (1972) attempted to test four hypotheses: "1. Salaries of public employees will be higher where per capita income or wealth is higher... 2. Salaries of public employees will be high if wages are high in competing private employment... 3. Salaries of public employees may vary with the quality of the supply of labor available locally... 4. The cost of living could have an important independent effect on salaries in public employment [for paternalistic reasons]" (p.215-6). To test these hypotheses, a cross-sectional national sample of median teacher wages from thirty-three metropolitan areas was taken.

Initially two regression analyses were performed on median salary. The first regression had only median family income (positive beta) as the independent variable and had an R^2 of .59. Salary was then regressed on family income and a cost of living index. The income variable coefficient was positive and significant, while the cost of living index coefficient was negative and insignificant (R^2 = .61).[27] When the dependent variable was operationalized as relative income (salary/median family income) and regressed on real per family income (median family income/cost of living), real per family income was found to be significant, but this regression had less explanatory power than the previous two regressions (R^2 = .45). Owen felt that "...once community income per capita is taken into account, the local cost-of-living effects add little to the explanation of teacher salary determination" (1972: p. 217). This could also be due to the fact that cost of living and per capita income were highly correlated.

Several more estimates were made to test the hypothesis on teacher quality (as measured by the percentage of teachers passing the Armed Forces Qualifying Test) and alternative (opportunity) wages (as measured by the average wage for managers, officials, and proprietors). Ordinary, two-stage, and causal-chain least squares regressions were performed. The two-stage OLS was performed on the assumption that teacher quality and wages are simultaneously determined. In the two-stage OLS estimates, quality of the teacher work force was regressed on family income and quality of the state's labor force (and alternative wage in a second model). Teacher salaries were then regressed on the estimate of the quality of the teacher work force along with other control variables. Teacher quality and quality of local labour supply were found to have statistically insignificant effects on teacher pay. Generally the results supported hypotheses 1 (re: per capita income) and 2 (re: alternative wage), while local cost of living, teacher quality, and local labour quality were found to be statistically insignificant. R^2s for the two stage regressions varied little (.86 to .88).

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[27] One has to wonder whether these two explanatory variables are highly correlated resulting in a multicollinearity problem. This could explain the negative coefficient on cost of living.

Owen also tested a causal chain system. Teacher salary was regressed on family income and alternative wage, and then teacher quality was regressed on the estimate of teacher salary and local labour quality. The results indicated that teacher salaries may be determined by per capita income and alternative salaries. These are essentially the same results that were obtained in the two-stage OLS regressions.

Hall and Carroll (1973) felt that Thornton (1971) and Baird and Landon (1972) remedied some of the problems of Kasper's (1970) seminal work but that these two studies suffered from three problems: (1) failure to control for interstate differences such as collective bargaining law and per capita income, (2) homogeneity of sample leading to questions of generalizability of results, and (3) inappropriate specification of the dependent variable. The authors felt that a point on a salary scale was an inappropriate dependent variable as it would not accurately reflect the economic benefits teachers received as would, say, average salary. They were also critical of the fact that none of the studies chose to consider pupil/teacher ratios, which could affect the ability of a school district to pay its teachers based on productivity. In the alternative, one may be convinced that pupil/teacher ratios and pay are positively correlated for reasons of compensating differentials: additional compensation may be required to entice teachers to accept more students in the classroom. This of course leads to an obvious causality problem. Which comes first: higher salaries due to pupil/teacher ratios or higher pupil/teacher ratios due to salary costs.

In order to test these questions, a cross-sectional sample of 118 school districts from a single suburban county (Cook County, Illinois) for the school year 1968-69 was drawn. The dependent variable was measured as the mean teacher salary in the school district while the independent variables tested were (1) median family income, (2) percentage of workers engaged in white-collar occupations, (3) average daily attendance, (4) percentage of teachers who are male, (5) the mean number of years of teaching experience, (6) state aid per pupil as a percentage of per pupil expenditures, and (7) the existence of a collective bargaining agreement. Drawing a sample from a single county controls for the legal and political environment, but the authors failed to control for union characteristics. This may have been easily accomplished by employing a dummy variable, as teachers in the U.S. are typically represented by only two unions, the NEA and AFT.

Family income, as to be expected, was hypothesized to be positively related to teacher wages, as were the mean number of years of teaching, the percentage of teachers who were male, the percentage of workers engaged in white-collar occupations, the existence of a collective agreement, and average daily attendance. The percentage of workers in white-collar occupations was intended to measure the willingness of the community to pay for education with the theory being that the greater the average education of the population, the greater the value they would place on education. Average daily attendance was thought to influence wages because it was felt that larger school districts would be more bureaucratic and teachers would have to be compensated for this drawback (compensating differentials), as well as the fact that larger districts may have more specialized programs with highly trained, and therefore better paid, staff. The belief of a positive association between the percentage of male teachers in the work force and wages was based on the assumption that males in the 1960s, more often than females, tended to be the primary bread winners and therefore would demand higher wages. It was expected that the greater the percentage of funds that came from state sources, the lower would be teacher wages. Poorer areas would have to rely more heavily on state sources of funding than richer areas.

In the first OLS regression, signs of all the coefficients were as expected, and all variables were significant at the 1% level, except for variables (2) and (4) which were significant at the 10% level ($R^2 = .70$). A second regression analysis was performed with independent variables (1), (3), (6), (7) and operating expenditures per pupil.[28] Family income, average daily attendance, and percent expenditure were significant at the 1% level and had the expected signs ($R^2 = .51$). The collective bargaining coefficient was significant (positive) at the 10% level, while, curiously, per pupil expenditures was found not to be statistically significant.

The authors then went on to discuss the inherent trade-off between pay and class size.[29] They felt that these two variables may be jointly determined. To test for this they ran a simultaneous regression with pupil teacher ratio and pay as the dependent variables. Salary was found to be related to family income (positive--1% level of significance), white-collar employment (positive--5%), average daily attendance (positive--1%), percentage of teachers who were male (positive--10%), mean years teaching experience (positive--1%), state aid as a percentage of total expenditures per pupil (negative--1%), existence of collective bargaining (positive--5%), and class size (positive--5%), and the regression had an R^2 of .71. Class size was found to be related to family income (surprisingly positive--5%), percentage white collar workers (negative--1%), average daily attendance (negative--1%), state aid as a percentage of total expenditures per pupil (positive--1%), existence of collective bargaining (positive--10%), and salary (positive--10%) and the regression had an R^2 of .50. This lends credibility to the belief that there is a strong positive relationship between class size and teacher pay.

Lipsky and Dronting (1973) performed regression analyses on salary levels and changes in salary levels in the wake of the passage of New York's Taylor law which granted collective bargaining rights to municipal employees (Kochan, 1973). As a result of the passage of the Taylor law, 63% of the almost 700 school districts in the state signed collective agreements in 1968, the vast majority for the first time. Four dependent variables were tested: (1) beginning salary for teachers with bachelor's degrees, (2) salary for teachers with seven years of experience and thirty hours of earned credit beyond a bachelor's degree, (3) salary for teachers with eleven years of experience and sixty hours of credit beyond a bachelor's degree, and (4) average salary in the school district.

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[28] This once again may be a good example of regressing a dependent variable against itself (Schmenner, 1973). This is primarily due to the large percentage of grade school educational budgets consumed by teachers' salaries, ensuring that these two variables are highly correlated.

[29] The NEA had since explicitly recognized the inherent trade-off between pay and class size (Gewirtz, 1979).

The rationale for using this variety of measures for the dependent variable was two-fold. The use of salary points in the collective agreement may be most appropriate due to the fact that salary points are the direct subject of negotiation. On the other hand. the average salary paid to teachers may be a more appropriate measure of actual compensation received by teachers.

Two models were tested. The first model had the following independent variables: (1) pupil teacher ratio, (2) enrollment, (3) enrollment squared, (4) percentage of teachers with a master's, or higher, degree, (5) within state location variable, (6) existence of collective bargaining, and (7) percentage of teachers with at least three years' seniority. The second or extended model had the previous seven variables and added: (1) total property value per pupil, (2) instructional costs per total property value, and (3) debt per pupil. While the expected effect of a number of these variables have already been discussed or are intuitively obvious, a few are not.

Percentage of teachers with a master's degree or better was expected to positively affect average salaries, as most school districts provided additional compensation to teachers with advanced degrees. This variable may also be a proxy for the quality of teachers demanded on the assumption that the more highly qualified the average teacher in a school district the higher the quality of teacher demanded. This, in turn, would necessitate higher salaries in general to attract these better teachers. The location variable was dichotomous for up-state and down-state New York and was based on the assumption that the higher concentration of school districts in down-state New York forced these districts to be more competitive, and therefore, increased salaries. In addition, down-state cost of living was higher which may force school districts to pay higher salaries. The higher the debt per pupil, the higher should salaries be. Debt can generally only be incurred for capital expenditures, and large debt per pupil could indicate a growing system in need of a large number of new teachers. Hiring a large number of teachers could place upward pressures on salary scales, but may also depress average salaries making the relationship between these two variables unclear. Instructional cost per total property value may indicate willingness to pay and therefore may be positively related to salaries.

Eight regressions were initially run (four dependent variables and two models) and most independent variables were significant at the 10% level or better and of the expected sign where the dependent variable was operationalized as a point on the salary scale. R^2s varied little (.54 to .63). Exceptions occurred for the collective bargaining variable, which was not significant at the 10% level in any of the eight equations and of mixed signs (two negative and six positive), and the pupil teacher ratio, which had negative signs and was only significant (10%) in the two regressions which used bachelor degrees with eleven years of experience and sixty hours of educational credit as the dependent variable. Where the dependent variable was specified as the mean salary, pupil teacher ratio, percentage of teachers with advanced degrees, and the location variable were significant at the 10% level for both models, and in the extended model, both total property value per pupil and debt per pupil were of the expected signs and significant at the 1% level (R^2s were .44 and .47). Of course these results lack generalisability. The short duration of the bargaining relationships studied and the relative youth of the collective bargaining legislation may have a serious influence on collective bargaining outcomes.

Three more regressions were run with changes in salary points as the dependent variable and used the variables in the basic model as the independent variables, except that pupil teacher ratio was left out and the percentage of male teachers in the school district was included. R^2s were only .063, .066 and .070. In these regressions, the contract variable was significant at the 1% level for all three regressions. Other significant coefficients included enrollment (in two equations, one at 1% and one at 5%--positive sign), percentage of teachers with advanced degrees (in two equations, one at 1% and one at 5%--surprisingly negative), percentage of teachers with at least three years experience (one equation at 5%--positive), and percentage of males in the work force (all three equations, one at 10% and two at 5%--positive).

Many problems exist with their attempt to explain wage changes. Lipsky and Dronting's theory was developed to attempt to explain wage differentials across New York state, as opposed to wage changes. Because of this, it is not surprising the R^2s for their wage change regressions were so low. For example, a positive and significant coefficient on enrollment would indicate that over the long term wages would be substantially higher in larger districts than in smaller districts. Theory, and some evidence, does not support this. In theory, large districts may exercise monopsony power and therefore be able to pay *lower* wages. The application of a static theory to the dynamics of wage changes may explain the poor results obtained and should not discourage researchers from attempting to explain wage changes.

Despite the fact that many studies have preceded and followed the previously summarized studies, little progress has been made in theory or methodology, with one exception.[30] The major addition to theory has been the role of work stoppages in determining final settlements, or in other words, how a work stoppage (part of the bargaining process) affects bargaining outcomes. Delaney (1983) provided the first in depth look at the effect of arbitration and strike availability and use on wage levels and changes in wage levels.[31] Initially, Delaney (1983) used all collective bargaining agreements negotiated in the states of Illinois and Iowa for the school years 1978-79, 1979-80, and 1980-81 for his regression analysis. Three dependent variables were tested: natural log of starting salary for teachers with bachelor's degrees, natural log of starting salaries for teachers with master's degrees, and natural log of average salary in each school district. A fairly standard set of explanatory variables was employed and included average teaching experience in the district, percentage of teachers who were male, natural log of the population of the school district, per capita income (a proxy variable for ability to pay), natural log of average daily attendance, opportunity wage, an AFL-CIO rating of legislators' favourableness to labour, a monopsony variable (percentage of teachers in the county employed by the largest school district), previous impasse activity (strikes in Illinois and arbitration in Iowa), and impasse activity in the current round of negotiations. A second set of regressions was performed on changes in salaries for the same time period using the same set of explanatory variables.

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[30] See for example Balfour (1974), Baugh and Stone (1982), Brown (1975), Cole (1977), Derber and Wagner (1979), Ehrenberg and Chaykowski (1988), Gallagher (1978a; 1978b; 1979), Kleiner and Krider (1979), Levin (1970), Lipsky (1982), Moore (1976), Olson and Jarley (1991), Perry (1979), Thornton (1979), Woodbury (1985), Zuelke and Frohreich (1977). The exception, with regard to methodology, might be Ehrenberg and Chaykowski (1988) who performed a fairly ambitious time series study, but their results were at best disappointing. The sample consisted of over 700 school districts in New York State over a five year period and tested several dependent variables (wage rates) and a multitude of independent variables, although these variables did not substantively differ from previous work. Very few of the independent variables were significant.

Only those coefficients related to impasse activity were reported. The impasse (strike or arbitration) variables were generally insignificant (16 of 18) at the 5% level, indicating that the use of impasse procedures does not affect salary levels.[32] When the regressions were run on salary changes, the results were somewhat different. Five of six strike coefficients for Illinois were positive and significant at the 5% level while none of the six coefficients for arbitration in Iowa were significant.[33] It appears that teachers have been able to extract larger wage gains from strike activity, indicating that the strike weapon may be a more valuable tool in their arsenal than compulsory arbitration.

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[31] Lipsky and Dronting (1977) investigated the choice of impasse resolution procedures on wage outcomes, but the description of their methodology was severely lacking. Delaney (1986) subsequently investigated the effect of strikes on non-wage collective bargaining outcomes.

[32] There were eighteen impasse coefficients from eighteen regressions. Three dependent variable measures were regressed on three years of data from two states (3x2x3=18).

[33] Each state had six coefficients related to impasses. They arise from use of three alternative dependent variable measures and two years of wage change data.

A third set of regressions was performed under the assumption that impasse use and salary levels (and changes in salary levels) were simultaneously determined. Under this assumption, the simultaneous OLS yielded positive and significant impasse coefficients for six of the nine regressions (three years of data and three dependent variables). Only those coefficients for the 1978-79 school year were insignificant. Three of the six coefficients of strike activity in the wage change regressions were positive and significant at the 5% level. From the simultaneous equations it appears that strike activity positively affected both salary level and changes in salary level. Coefficients for the arbitration variable were generally insignificant and of mixed signs, leading to inconclusive results. From these results it can be tentatively concluded that strike use by teachers in the Illinois system is positively associated with changes in salaries and may affect salary levels.

Overall, these studies have focused on economic variables and have only controlled for union characteristics in the crudest of manners. Testing (or controlling for) the effects of union and management characteristics, bargaining process, average teacher experience, and legal environment on teacher pay has largely been neglected, quite possibly due to the great difficulty one has in developing a large data base to test for these items. Failure to control for working conditions and fringe benefits are two other areas that have largely been neglected and can be traded for wages at the bargaining table. It is also clear that the political climate can have a severe impact on bargaining outcomes and distinct paradigm shifts have been observed in the U.S. since the 1960s (Kochan and Katz, 1988). As the political climate is cyclical, previous cross sectional studies may be subject to transitory political considerations, also decreasing the value of this work. The state of the labour market has also been ignored, even though unemployment rates generally affect wage rates (Gunderson and Riddell, 1988).

Many interesting research questions remain to be investigated. Undoubtedly controlling for these variables by developing a large data base is a difficult task; yet, results could be improved if these variables were controlled for. Compiling a data base from a single jurisdiction increases the homogeneity of the sample, which controls for a variety of variables, thereby allowing for a cleaner study. In addition, the cross-sectional nature of most studies does not allow for the netting-out of many transitory factors. This study uses data from a longer time period and is a study of a single jurisdiction. This controls for a variety of factors and may provide long term applicability.

IV. Institutional Features

The institutional features surrounding public-sector collective bargaining such as a union's political activity, organizational structures, and public policy can have a significant impact on collective bargaining (Hondale, 1981a; Lipsky, 1982), and a number of studies have attempted to measure the affect of various institutional features on teachers' wages. Woodbury (1985) found evidence in the United States that the scope of bargaining (i.e., whether some bargaining issues are legal, illegal, mandatory, or permissive) can have an impact on collective bargaining outcomes. One advantage of this study is that the institutional features of teacher bargaining in Alberta have been constant across the province, thereby controlling for institutional features (e.g., collective bargaining framework, government structure, and bargaining representation).[34]

(1) Current Status

In Canada, all powers with regard to education fall under the exclusive jurisdiction of the provinces. Section 93 of the Constitution Act, 1867 (formerly referred to as The British North America Act, 1867 or The BNA Act) clearly lays out such jurisdiction: "In and for each Province the Legislature may exclusively make Laws in relation to Education," subject only to a few minor restrictions (Department of Justice, 1987: 34). Prior to 1925, labour legislation was thought to be within the jurisdiction of the Federal Government, and they in turn had passed many pieces of legislation dealing with union/management relations (Craig, 1990). In the wake of a decision by the British Privy Council in 1925, jurisdiction over labour relations fell to the provinces under the provisions of s. 92 of what was then The BNA Act. The British Privy Council felt that labour relations was an issue of property and civil rights, and s. 92 clearly states that issues relating to property and civil rights fall under the exclusive jurisdiction of the provinces. Except where the federal government retained jurisdiction over certain industries and sectors of the economy under the terms of s. 91 of The BNA Act, which lays out the jurisdiction of the federal government, jurisdiction over labour relations fell to the provinces. Due to the combination of these two factors, the Province of Alberta has exclusive legislative authority with regard to education and collective bargaining in education.[35]

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[34] With the impending changes proposed to the school system in Alberta in 1994, a structural break will likely occur, barring a successful constitutional challenge by the Catholic School Boards. These changes are discussed at the end of this chapter and possible consequences will be discussed in light of the empirical results.

In turn, Alberta's School Act delegates the power to deal with issues of education to school boards established under the act, subject to a minimum number of constraints dictated by the School Act and also by the regulations passed by the Alberta Government under the authority of the School Act. The creation of school boards is an attempt to provide an arms length bargaining relationship between the Alberta Teachers' Association and the Province despite the fact that the Province regulates the system and provides a substantial portion of grade school education funding. This lack of direct control has at times been lamented by many provincial governments (Muir, 1968) and may have provided the fodder that resulted in the increasing centralization of teacher bargaining in Canada since the 1960s.[36]

A very important feature of the School Act is that it provides each school board with an independent authority to tax property.[37] The delegation of power to local school districts includes the ability to collectively bargain with the Alberta Teachers' Association (ATA), a certified trade union under the Labour Relations Code (LRC). This results in highly fragmented bargaining with a central authority (i.e., the ATA) and creates a tension between the economic condition of the local school board and the desire by the ATA to standardize contract provisions across Alberta. The Provincial Government, in turn, may also have the ability to influence a school board's spending through the funding they provide to the school districts, although the level of support given by the Province to local school boards, as a percentage of total funding, has fallen, forcing school boards to rely more heavily on their own taxation power and other revenue sources. Graph 4-1 provides an illustration of the changing mix of funding to the school boards.

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[35] Provincial jurisdiction is only fettered by the terms of s. 23 of the Constitution Act, 1982 (more commonly referred to as the Canadian Charter of Rights and Freedoms) which makes provisions for minority language education rights.

[36] This may be one of the reasons that the Province is altering the funding regime of grade school education.

[37] In the United States, the ability of school districts to independently raise revenues varies from state to state (Perry, 1979; Schmenner, 1973). Some school boards are dependent on revenue allocation from the municipality.

Several features of teachers' collective bargaining in Alberta distinguish it from the U.S. system where previous labour economics work has been done. The most important feature may be the fact that under the terms of s. 5(1) of the Teaching Profession Act "...the employment of a teacher by a school board, other than as a superintendent, is conditional on the teacher being and continuing to be an active member of the [Alberta Teachers'] association." Membership in the ATA is required prior to hiring and membership dues are payable upon employment. The Teaching Profession Act also allows the ATA to pass internal bylaws and discipline its members for violations of those bylaws. Section 11 of the ATA's bylaws states that the ATA is the exclusive bargaining agent for all its active members.[38] These provisions ensure that education is a closed shop, and the exclusive jurisdiction to represent teachers in publicly funded school systems falls to the ATA, a position they have enjoyed since the 1930s (Alberta Teachers' Association, 1992).

Although bargaining is undertaken on a local basis, it is of import to note that the ATA is the bargaining authority for teachers and not the individual locals, and has the final right of acceptance or rejection of a negotiated collective agreement (Walker, 1993). The ATA was the first provincial teacher union to receive statutory bargaining rights (Muir, 1968). It has bargaining certificates issued under s. 37 of the LRC with

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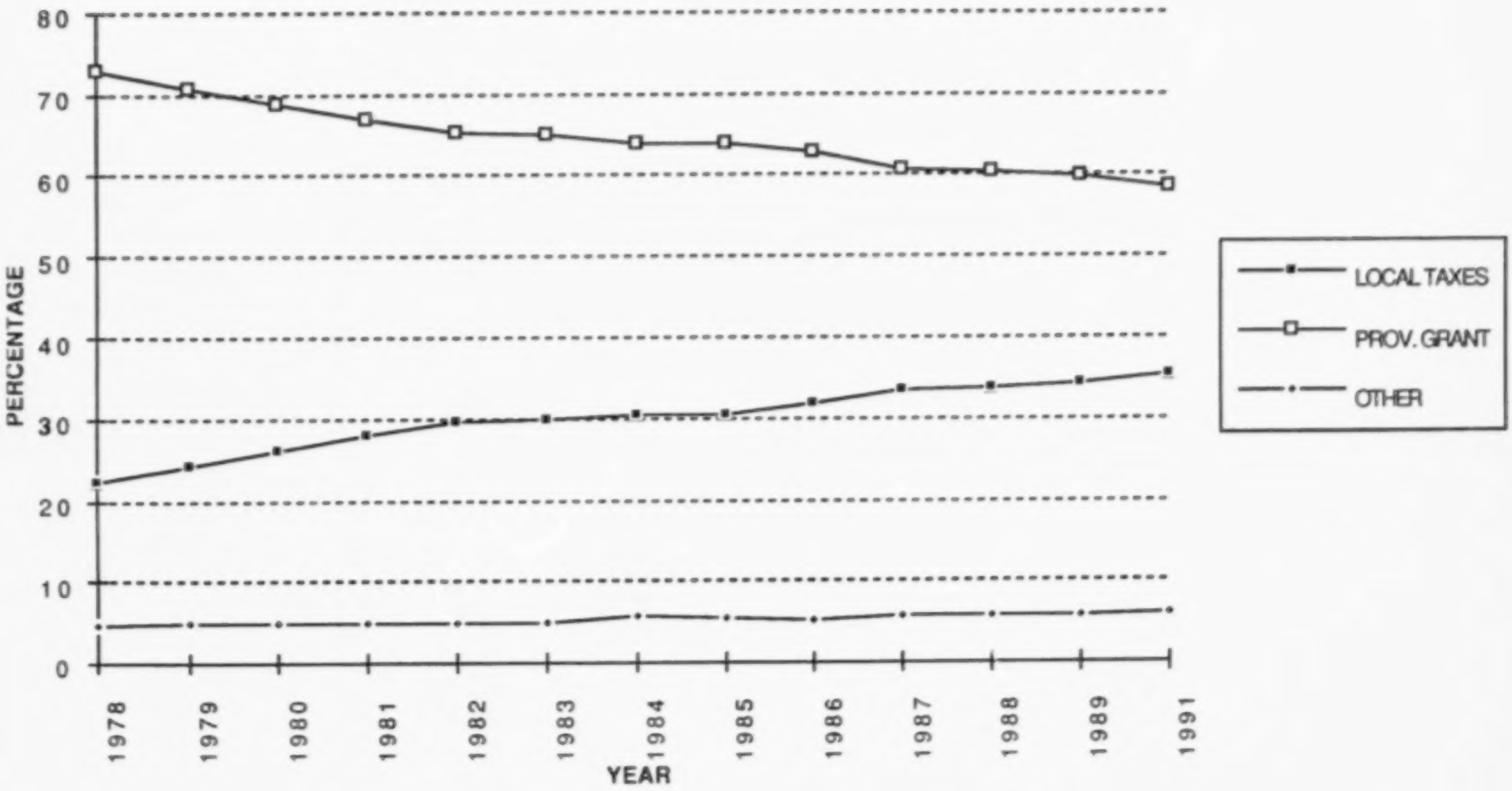
[38] All individuals who hold a teaching certificate and are employed by a school board, except for school superintendents and their chief deputy, are required to be members of the ATA and are therefore members of the bargaining unit (Alberta Teachers' Association, 1992).

GRAPH 4-1
REVENUE DISTRIBUTION



approximately half of the school boards in the province, and the remaining school boards bargain with the ATA under the voluntary recognition clause (s. 40) of the LRC. This has removed the need to include any variables that deal with the extent of unionization of teachers in Alberta as it is a totality of all teachers employed by publicly funded schools.

The fact that only the ATA represents teachers in collective bargaining in Alberta overcomes the problems as to how teacher representation and union characteristics need to be handled in a regression analysis. In many of the previous studies, the level and type of teacher organization must be controlled for (and often was not). This can be difficult, as most studies have dealt with a variety of collective bargaining relationships. In Alberta, there is no difference in the legal status of collective bargaining with teachers across the province, nor in their legal bargaining representative.

The school boards in Alberta have a voluntary umbrella association, the Alberta School Boards Association (ASBA). The ASBA first met in 1907 and was incorporated in 1939 by the passage of the Alberta School Trustees' Association Act (ASBA, 1993). The name was subsequently changed to its present form, the Alberta School Boards Association, in 1991. At the founding convention of the Association, two objectives were approved that remain with them today:

> To provide a medium of communicating with the Minister of Education the views of the people of the Province on educational questions and of pressing the same on his attention; and
>
> To consider all matters having a practical bearing on education and the school systems (Alberta School Boards Association, 1993: 11-12).

The Alberta School Boards Association (ASBA) is not the bargaining agent for the school boards. It might be more appropriately described as a provincial lobby group and professional support service. It will provide assistance to school boards in a number of capacities, including collective bargaining, on a fee-for-service basis when requested. It also serves as a central repository for a variety of information. Until 1993 all school boards were members of the Association. In 1993 the Calgary Public School Board withdrew from the association (Walker, 1993).

Under the terms of the School Act, the LRC provides the legal framework for teachers' collective bargaining. The LRC dictates that the parties to collective bargaining must meet and confer, bargain collectively in good faith, and make every reasonable effort to enter into a collective agreement (s. 58). The LRC provides employers with the right to form employers' associations and therefore bargain jointly (s. 19), and it provides the school boards with the right to lock its employees out upon the termination of a contract and upon the meeting of certain other prerequisites in the LRC. On the other hand, there are no provisions in the LRC for creating binding employers' organizations, as in Alberta's construction industry. Employers, in this case individual school boards, may not create registered (binding) employers' associations, and it has been known for these employers' associations to break down in the face of a teachers' strike (Carter, 1992).

As with private-sector employees, the LRC provides teachers with the right to strike after analogous preconditions have been complied with, as is the case in Ontario (Downie, 1992). Under the terms of the LRC, the obligation to bargain in good faith continues after the commencement of a lawful work stoppage, and workers retain their collective bargaining rights and are considered to continue to be "employees" of the struck employer.[39] Although the LRC does not preclude the use of replacement workers, the fact that the School Act provides for mandatory membership in the ATA renders use of replacement workers during a teachers' strike *de facto* impossible.

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[39] Many of these provisions do not exist in U.S. law (Bemmels, Fisher, and Nyland, 1986).

When coupled with the terms of the School Act, publicly employed teachers are placed in an enviable collective bargaining position. The School Act entitles most residents of Alberta over the age of six and under the age of eighteen to be provided with state funded education and also requires the vast majority of individuals between the ages of six and sixteen to attend school. This, in turn, creates a rather large and inelastic demand for education, and thereby, teachers. This is a somewhat typical position of many public-sector employees and its relative merits have been vigorously debated, beginning with Wellington and Winter's (1969) previously discussed, seminal article on public-sector collective bargaining.

With regard to the specific terms of the collective agreements between the ATA and local school boards, teachers' salaries are a function of two variables: (1) educational attainment and (2) experience. These two factors that determine the pay grid are consistent across all school boards, and the combination of all these preceding factors provides for a consistent framework for public-sector teachers' collective bargaining, and precludes a necessity for the study to control for the type of union and extent and strength of collective bargaining for each observation.[40]

Two other factors add to the ease with which collective bargaining outcomes may be tested, one with regard to teacher mobility and the other with regard to fringe benefits. Teachers in Alberta have virtual perfect mobility when changing jobs, thereby curtailing or eliminating the potential monopsony power of school districts. Educational attainment, one of two factors on which pay is based, is certified by a provincial board and applies to the individual teacher no matter where they work in the province. Experience, the other factor on which pay is based, is almost perfectly portable.[41] Another factor that allows for perfect mobility is the nature of ATA pensions in Alberta. The plan itself is province-wide, no penalties are imposed or contributions lost when changing school districts, and contribution rates and benefits are standardized under the terms of the Teachers' Retirement Fund Act. With regard to benefits, benefit packages are virtually identical across the province, severely curtailing the distortions that might arise from differences in benefits (Walker, 1993).

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[40] This basic institutional framework has prevailed for teachers' in Alberta for well over twenty-five years (see Denny, 1977).

Overall, the constant province-wide institutional framework helps control for the legal environment, political environment, union characteristics, and non-wage bargaining outcomes. This allows the study at hand to focus on the remaining variables (primarily economic) with a minimum of "noise" due to failure to control for relevant variables. The one area that suffers is issues related to local bargaining process. Characteristics at the local level may have some influence over bargaining outcomes (Hammer and Wazeter, 1993).

(2) Proposed Changes

The generalizability of the findings of this study to future collective bargaining outcomes in Alberta may be influenced by coming changes to the institutional regime. Although these changes have not been directly considered in the following statistical analyses they certainly may influence the long term generalizability of the findings and the changes may have a serious impact on the collective bargaining system and are worth considering Three major changes have been proposed to the structure of education in Alberta. The first proposed change is that the Province wishes to reduce the number of school boards in the province from more than 140 to approximately sixty (Edmonton Journal, January 19, 1994). This is being done in an attempt to gain some administrative efficiency. It may have been partly spurred by the fact that many school boards do not actually operate any schools nor do they employ any teachers.

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[41] Due to very slight differences in the definition of experience between collective agreements, it is theoretically possible to lose one or two increments when moving jobs, but it is extremely unusual (Walker, 1993).

The second change, and the one that will undoubtedly have a greater impact on collective bargaining, is that the Province is going to take over the collection of property taxes associated with education from the school boards (Edmonton Journal, January 20, 1994). The reason for this is to primarily facilitate the last set of changes.[42] In 1994, property taxes in Alberta were made up of two components. The first part is earmarked for the municipality to pay for municipal services while the second part is earmarked for the school board to pay for education.

The third area for change relates to tax rates and school board funding. Not only will the Province take over property tax collection, the Province intends to equalize mill rates over the Province and equalize spending per student. In 1992, the ratio of spending per student from the highest spending school district to the lowest spending district was about six to one while the highest mill rate was 55.46 while the lowest was 1.18 (Alberta Education, 1992). Approximately two thirds of the mill rates across the province will fall (Edmonton Journal, January 19, 1994). Equalizing spending per student will likely have ramifications for collective bargaining as the higher spending districts (on a per student basis) attempt to cope with severe revenue losses within the constraint that teachers' wages comprise a large portion of their total operating budget.

These changes will exacerbate the already difficult situation the school boards are in in the wake of a reduction in grants to the school boards by the equivalent of 5% of each school board's total wage bill. In previous years the school boards may have been able to raise tax rates to cope with the change but this course of action has now been precluded by the changes proposed by the Alberta government. Other methods to cope with the loss of revenue will have to be considered.[43]

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[42] The Catholic school boards across the province have vowed to fight the proposed changes (Edmonton Journal, March 21, 1994). They feel that the proposed changes will violate their constitutional right to control the education of Catholic school children as guaranteed under the Alberta Act which saw Alberta enter into confederation.

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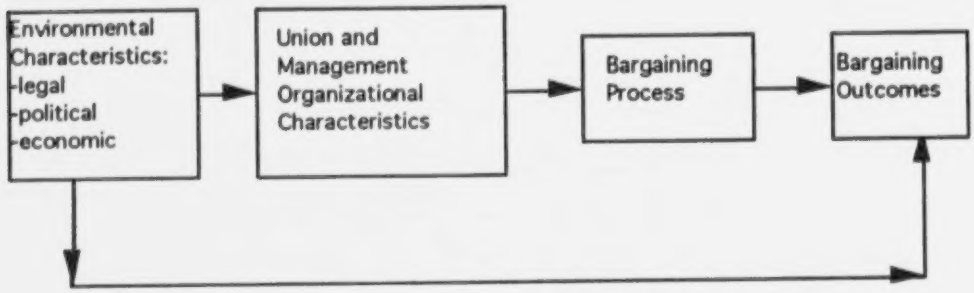
[43] The province may have cut grants and removed taxation power in tandem to ensure that cuts to school boards would translate into spending cuts rather than higher property taxes.

V. Research Questions and Hypotheses

As previously mentioned, the institutional regime has been constant across the province and over the period of this study. The union (ATA) has remained unchanged, and all school boards have the same basic organizational form and characteristics. Recalling Kochan and Wheeler's (1975) model:


Environmental Characteristics:
-legal
-political
-economic
Union and Management Organizational Characteristics
Bargaining Process
Bargaining Outcomes

The homogeneity of the collective bargaining regime should control for the legal characteristics of collective bargaining, and union and management characteristics should be relatively consistent across the province. As a result, this allows the study to focus on the following areas:

(1) ability to pay (economic);
(2) willingness to pay (political);
(3) general economic conditions;
(4) productivity (economic);
(5) lawful work stoppages (bargaining process).

These five basic areas will be reflected in the hypotheses that follow.

(1) Unit of Observation

The unit of observation in this study will be the individual school district or coalition of school districts which bargain jointly, as this is the level at which wage determination actually occurs and therefore "is the natural unit of observation" (Woodbury, 1985: 199). Ideally:

> if a theory of bargaining outcomes is to be developed which has any explanatory power, the dependent variable should be measured at the level at which the complex and subtle process of bargaining takes place (Kochan and Wheeler, 1975: 48).

Having the unit of observation the local school board heeds this advice.

(2) Dependent Variable

The dependent variable in this study will be changes in wages on the salary grid. There are several reasons for this choice of dependent variable. Arguably, individuals are influenced by the actual pay they receive rather than average pay, and actual pay is the subject of collective bargaining, in spite of the fact that average salary has been the dependent variable in many previous studies. In addition, Perry (1979) argues that the wage gains from collective bargaining will not be accurately reflected in average salaries due to distortions from growing or shrinking workforces. Using changes in pay grids avoids this problem.

(3) Ability to Pay

The relative wealth and budgetary resources of each municipality can affect the expenditure levels of municipalities (Ehrenberg and Goldstein, 1975; Gallagher, 1978; Masten and Quindry, 1970), and the willingness and ability of the municipality to pay its employees (Cole, 1977; Kasper, 1970; Perry, 1979). Ability to pay is often an issue at the collective bargaining table in both the public and private-sector (Derber and Wagner, 1979). A multitude of variables have been used to measure the relative wealth of each municipal area such as per capita income (Baird and Landon, 1972; Balfour, 1974; Bartel and Lewin, 1981; Ehrenberg and Chaykowski, 1988; Kasper, 1970;

Kleiner and Krider, 1979; Zuelke and Frohreich, 1977), property tax assessment per capita (Brown and Medoff, 1988; Gerhardt, 1976; Schmenner, 1973), property tax assessment per average daily attendance (Gallagher, 1978b, 1979; Holmes, 1976), total tax base (Annable, 1974; Ehrenberg and Chaykowski, 1988; Lipsky and Dronting, 1973; Masten and Quindry, 1970), average family income (Bartel and Lewin, 1981; Benecki, 1978; Brown and Medoff, 1988; Ehrenberg and Chaykowski, 1988), government revenue per capita (Horn et al., 1982), and average level of wages and salaries in the community (Thornton, 1973).[44] There appears to be little debate over the effect of increased wealth of municipalities on municipal expenditures and municipal employee wages. Hence:

> Hypothesis 1: Increases in the wealth of the municipality are positively related to changes in teacher salary, all else equal.

Major sources of funding for many municipal expenditures are three fold. Money can come from the municipality itself, as it has the power to levy taxes and raise funds; it may come from the state or provincial level; and support may also come from the federal level (Baird and Landon, 1972; Kasper, 1970). In the U.S., the total percentage of funding coming from the state level and increases in state grants to education have been independent variables included in both cross-sectional and time-series models, respectively, and appear to affect a jurisdiction's ability to pay (Ehrenberg and Chaykowski, 1988; Gallagher, 1978b; Kasper, 1970; Landon and Baird, 1971). Increased levels of government spending have also been found to be positively related to increases in wages paid to government employees (Freund, 1974).

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[44] Since most of the studies cited are cross-sectional studies, these variables have been measured as stock or static variables, but in the few instances where the studies have used longitudinal analysis or tested wage changes, many of these variables have, as would be expected, been measured as changes in these variables.

In Canada, these grants may also provide higher levels of government with the ability to exert some influence over bargaining outcomes (Goldenberg, 1979). The greater the increases in funding provided by outside sources, the greater should be the ability of the municipality to pay its employees. As a consequence:

> Hypothesis 2A: Funding increases from higher levels of government are positively related to changes in teacher pay, all else equal.

As there is a tendency for higher levels of government in Canada to provide education grants on a per capita basis, poorer districts may be forced to rely more heavily on these sources of funds, while richer districts may provide more of the district's total funding from local revenue sources. The effect of reliance on higher levels of funding implies:

> Hypothesis 2B: The greater the funding received from higher levels of government, as a percentage of total school board funding, the smaller will be increases in teacher pay, all else equal.

Changes in enrollment may affect the finances of the local school district (Balfour, 1974; Ehrenberg and Chaykowski, 1988; Zuelke and Frohreich, 1977). Balfour (1974) employed the percentage of a state's population between five and seventeen as a proxy for the demand for educational services in a state. He hypothesized that this percentage would be positively related to salaries as increased demand for teachers should force wages upward. Balfour employed a multiple regression analysis with step-wise deletion of variables. As a consequence, the population variable was eliminated from the analysis, so no parameter estimates were obtained.

In a longitudinal study, expanding enrollment figures may stretch local finances, resulting in a need for careful cost control. It is quite plausible that in response to growing enrollment figures, the need to hire more teachers to cope with growth may entice a school board to attempt to keep wage increases to a minimum to minimize increases in the total wage bill.[45] Hence:

> Hypothesis 3: Changes in total school board enrollment and changes in teacher pay are inversely related, all else equal.

Cross-substitution of expenditures between municipal budget categories in response to economic, political, and collective bargaining pressures has been well established in previous academic work (Benecki, 1978; Craft, 1970; Eberts, 1983; Gallagher, 1979; Horton, 1986; Perry, 1979; Valletta, 1989). Such substitutions have typically taken the form of moving money from one operational area to another (e.g., taking money from the fire department and putting it into the police department) or moving money from administrative categories to salary categories, or vice versa, although the former appears to be the general trend.

In this study, the potential for such substitutions is reduced due to the independent standing of the school boards and their power to tax municipal rate payers in order to obtain funding. In addition, under the terms of Division 6 of the School Act, a school board must meet all non-capital spending requirements within the current fiscal year. As a result, school boards may not borrow to meet salary obligations and the only serious substitution that can occur is moving money between administration and salary requirements. This process has been quite explicit in some cases. In California, teacher union officials and administrators jointly combed proposed budgets in the attempt to discover "misallocations" of funds in order to free up funds for teacher pay (Craft, 1970). Whether there were misallocations of funds was a specific bargaining issue.

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[45] A school board may also attempt to increase the pupil teacher ratio to reduce costs.

With the ability of local school boards to substitute from one budget category to another, possibly in an attempt to minimize the total tax bill in order to increase the chances of a trustee being reelected, it appears that:

> Hypothesis 4: The greater the percentage of total school board budget devoted to instructional tasks at time t-1, the lower the increases in teacher pay at time t, all else equal.

This does not necessarily mean that such substitutions will occur, but as the political limits of taxation are reached, administrators will look towards such substitutions as they attempt to balance their budgets (Gallagher, 1978). As school boards attempt to deal with recent funding cuts, such developments appear to be occurring quite explicitly in Alberta in 1994, both by choice and in response to lobbying by teachers (Edmonton Journal, April 13, 1994).

(4) Willingness to Pay

Ability to pay will not necessary capture the willingness of the school district to pay teachers. Each community may have a different "taste" for education or high public-sector salaries (Balfour, 1974; Ehrenberg and Chaykowski, 1988; Ehrenberg and Goldstein, 1975; Horn et al., 1982; Olson, 1984; Thornton, 1979), and one can argue that the taxpayer plays the role of the consumer in public-sector models of collective bargaining (Lipsky, 1982; Pauley, 1969).

This public consumption role implies that certain socio-demographic characteristics of the entire community may influence the level of wages paid to municipal employees in general. Trustees, if they are interested in being re-elected, must be cognizant of the tolerance level for tax increases, and also public perception of whether teachers are under or over paid. It has been suggested that such things as community education level, both at the secondary and post-secondary level, percentage of households with children, and percentage of the population employed in white collar jobs all positively affect attitudes towards high teachers' wages, thereby reducing the political constraints municipalities or school boards face when negotiating teacher settlements (Ehrenberg and Chaykowski, 1988; Gallagher, 1979; Hall and Carroll, 1973). Lowe and Krahn (1989) found that New Democratic Party (NDP) supporters are systematically more pro-union and Anderson (1979) found a strong relationship between NDP support and municipal wages and collective bargaining outcomes. Arguably support for Canada's "labour" party (NDP) may indicate a willingness or propensity to pay higher public-sector wages leading one to conclude that:

> Hypothesis 5: Local support for the New Democratic Party is positively related to increases in teacher pay, all else equal.

(5) General Economic Conditions

Some authors have suggested that general economic conditions (market forces) can affect the outcomes of public-sector collective bargaining just as they affect private-sector wage changes. Alternative employment (wage) opportunities and wage changes in the economy as a whole may provide a strong influence on wage changes for public employees (Annable, 1974; Bartel and Lewin, 1981; Delaney, 1986; Fogel and Lewin, 1974; Hondale, 1981a; Nelson et al., 1981; Owen, 1972; Perry, 1979; Schmenner, 1973; Thornton, 1973; Zuelke and Frohreich, 1977). The average level of wages or changes in wages may also be a proxy for the nature of the labour market governments face (Brown and Medoff, 1988). Brown (1975) came to the conclusion that "...teachers' salaries are more closely tied to the local and area economies and perhaps the salaries of other local groups than to the presence of collective power" (p. 62). This leads me to believe:

> Hypothesis 6: Wage changes for all workers in the same geographic area vary positively with wage changes for teachers, all else equal.

In addition, unemployment rates may have a negative effect on the ability of public (and private) sector employees to make wage gains at the collective bargaining table, or may be a proxy for the slackness or tightness of the labour market (Freund, 1974; Horn et al., 1982). This results from basic supply and demand characteristics of the labour market. When unemployment is low, it naturally follows that in order to recruit and retain qualified personnel, an employer, whether from the public or private-sector, must increase wages as the competition for employees increases (Gunderson and Riddell, 1988). In contrast, during periods of high unemployment, work opportunities are diminished, thereby resulting in less competition for qualified personnel. This moderates or negates upward wage pressures. This leads to the conclusion that:

> Hypothesis 7: Changes in teachers' wages are inversely related to unemployment rates, all else equal.

Inter-regional differences in changes in cost of living also have the ability to influence collective bargaining (Freund, 1974). Public-sector unions are likely to demand larger wage increases as the cost of living increases, since workers attempt to maintain their relative wage levels (Nelson, et al., 1981). Hence:

> Hypothesis 8: The rate of inflation varies positively with teachers' wage changes, all else equal.

This is consistent with Owen's (1972) paternalism hypothesis, although cost of living was found to be statistically insignificant in his study.[46]

(6) Productivity

It has been theorized that worker productivity can have an effect on the ability of an employer to pay wages to its employees (Gunderson and Riddell, 1988). With regards to teacher productivity, there are two things that, in combination, are indicative of the productivity of teachers. The first is the pupil teacher ratio:

> The number of students in a teacher's class is probably the clearest indication of the amount of work expected of that teacher (Gewirtz, 1979: 59).

This ratio, in and of itself, is not completely indicative of the productivity of teachers, as it does not speak to the quality of education that students are receiving (other than the possible amount of personalized time a teacher may give to an individual student). Student achievement would also have to play a role in a true measure of the productivity of teachers, but comparing student achievement can be rendered impossible in the absence of standardized testing of students. In the absence of such data, a researcher must be content with looking exclusively at the pupil teacher ratio. Increasing this ratio is a possible goal as a municipal district or school board attempts to minimize its total wage bill, and, in turn, teachers may accept higher pupil teacher ratios if they translate into higher pay (Cole, 1977; Ehrenberg and Chaykowski, 1988; Gallagher, 1978a, 1978b, 1979; Lipsky and Dronting, 1973; Perry, 1979; Thornton, 1973; Woodbury, 1985; Zuelke and Frohreich, 1977). Chambers (1977) found that collective bargaining in California has raised teacher salaries as well as pupil teacher ratios, and the NEA has recognized the potential for abuse:

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[46] The paternalism hypothesis refers to the notion that public employees should receive a "fair day's pay" and be protected from the rising cost of living.

> class size is uniquely subject to abuse, for increasing the size of a class by even one student remains the easiest--and surely the most insidious--way for a school board to attempt to force a teacher to perform more work for a fixed amount of salary within otherwise set parameters (Gewirtz, 1979: 59).

These observations leads me to:

> Hypothesis 9: Changes in pupil teacher ratios are positively related to changes in teacher salaries, all else equal.

In the alternative, one may consider higher pupil teacher ratios as a measure of workload (Gewirtz, 1979; Woodbury, 1985). Higher pupil teacher ratios in a school system may require higher pay as a compensating differential to account for less favourable working conditions in a district.

(7) Lawful Work Stoppages

Part of the bargaining process entails the use of economic sanctions. Lawful work stoppages and prior lawful work stoppages may have an effect on the outcome of collective bargaining as "the cost and financial stress of a work stoppage usually cause one (or both) of the parties to reconsider its position" (Fisher and Williams, 1989: 204). Work stoppages can be considered an investment in the current round of negotiations or may be an investment in future bargaining power, and prior strike activity can signal the willingness of unions to engage in further strike activity (Eaton, 1972). It can also be indicative of how aggressive a union is (Freund, 1974). Prior strike activity also speaks to a very important question that may have a great deal of influence on collective bargaining as an impasse nears: is the strike threat credible (Gerhart, 1976; Olson, 1984; Schelling, 1956; Weintraub and Thornton, 1976)? These arguments generally indicate a positive correlation between present and prior strike activity and collective bargaining outcomes.

Lipsky and Dronting (1977) and Olson (1984) found that prior strike activity by teachers increased the likelihood that teachers would strike in the present round of collective bargaining, possibly signaling the militancy of the union, and Delaney (1986) found that prior strike activity had a positive effect on non-wage bargaining outcomes, adding weight to the strike credibility hypothesis. It is possible that a strike may force a union local to accept a lower wage settlement, although evidence in the private-sector appears to be to the contrary (Riddell, 1980).[47] If a gain is made by a school board during a prior round of negotiation through enduring a work stoppage (i.e., the school board has forced teachers to reduce their bargaining expectations), the school board may be the target of teachers for high wage increases in the present round of bargaining as teachers attempt to make up for lost ground. From both of these lines of reasoning it appears that:

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[47] The nature of the economy as whole may influence these findings. As is often the case, the bargaining power of a union may rise during expansionary times and fall during a recession (Fisher and Williams, 1989).

> Hypothesis 10: A work stoppage in the prior round of collective bargaining is positively related to increases in teacher salary, all else equal.

When dealing with the effect of a public-sector strike on the present round of collective bargaining, theory and evidence become somewhat more convoluted and ambiguous (Delaney, 1983). For instance, Delaney (1986) found no significant relationship between bargaining outcomes and the strike activity of teachers. This is in sharp contrast to Wellington and Winter's (1969) beliefs that there are few market restraints on the public-sector due to the inelastic nature of demand for government services, and the monopoly enjoyed by many government departments allows for the extraction of especially large economic rents, particularly where the right of public employees to strike coexists with collective bargaining.[48]

Wellington and Winter's (1969) beliefs are consistent with the findings of Subbarao (1979) who found that Canadian federal civil servants, under the choice-of-procedures mechanism governing collective bargaining by Canada's Federal public servants, that used the strike weapon faired significantly better than those employees that relied on arbitration to resolve impasses.[49] On the other hand, Lipsky and Dronting (1977) found highly ambiguous results in their investigation of the relationship between the choice of impasse resolution procedures and wage settlements (e.g. mediation, fact-finding, strike), but this is beyond the scope of this study. This may be due to the possibility that strikes are a defensive action employed by unions to maintain their relative wage position rather than as an attempt to gain larger than average wages

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[48] Burton and Krider (1970) provide a lengthy rebuttal to the arguments of Wellington and Winter (1969) and it is important to note that government continues to accrue revenues despite a work stoppage, in contrast to the private sector.

[49] Under Alberta's LRC, union and management may enter into binding interest arbitration if both parties agree. In practice this rarely occurs for teachers.

(Delaney, 1983). In spite of the ambiguity, the demands of parents in education may require school boards to settle at almost any cost (i.e., increases in taxes) and hence:

> Hypothesis 11A: Work stoppages are positively related to changes in teacher pay, all else equal.

This may also be a result of teachers' attempting to set a pattern for settlements in a decentralized bargaining environment.

In turn, the length of a strike may increase pressures to settle from parents of school age children as school days are lost to the strike. Teachers are also often taken for granted as "free public baby sitters:"

> Hypothesis 11B: Work stoppage length and changes in teacher pay are positively related, all else equal.

There is also another potential off setting factor. School boards do not incur payroll costs during a strike but also do not lose any revenue. School boards may be able to finance some or all of the subsequent wage increase with these wage savings.

VI. Variable Definition, Data Sources, and Methods

This longitudinal study is primarily based on information gleaned from secondary data sources such as Statistics Canada, Alberta Education, the ASBA, and the ATA.[50] Data are reconstructed starting with the 1978-79 school year and ends with the 1991-1992 school year, as this is the last school year for which all data required are available. Starting the study prior to 1978 would likely be of little use as Canada was experiencing federally imposed wage and price controls (Craig, 1990), which could seriously distort findings. During this fifteen year period Alberta experienced at least three periods of expansion (1978-81, 1984-85, 1988-90) and two periods of recession (1982-83, 1986-88), which may allow results to be generalizable over the long term (Statistics Canada, 1992).

Multiple linear regression is used to analyze the data. The unit of observation is the individual school board or group of school boards, where school boards are members of an employers' association. This is the most relevant unit of observation, as this is the level at which collective bargaining actually occurs. Where employers' associations are involved, information from local school boards is aggregated to calculate values. The relevant population is all public and separate school boards within the Province of Alberta that operate at least one school, and a census was attempted for the study. The number of operating school boards has varied over this period and number at approximately 135, but due to the existence of employers' associations, the maximum number of observations in any given year number at approximately 85.

Three alternate measures are used to operationalize the dependent variable. Wage change is operationalized as (1) the annual percentage change in starting salary for teachers with four years of post-secondary education (CMIN), (2) the annual percentage change in maximum salary for teachers with four years of post-secondary education (CMAX), and (3) the annual percentage change in the arithmetic average of the starting and top salary for teachers with four years of education (CAVG).[51] The last measure is used to account for any flat or across the board increases (i.e., the entire grid is increased by a fixed dollar value, say $2000, rather than simply by a fixed percentage). Interviews with key players indicate that the minimum and maximum rates for teachers with four years of post-secondary education (bachelor degree or equivalent) are the key rates upon which school boards calculate their settlement costs and, consequently, are the wage rates upon which negotiations focus. Wages rates used were those that existed at September 1 of the year, the beginning of the school year. This information was obtained from the ATA.[52]

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[50] Two interviews were also performed. Each interview was approximately one and a half hours and consisted of open ended questions on the structure of collective bargaining, determinants of pay, and availability of data. Those interviewed were George Walker, Executive Assistant, Alberta School Boards' Association, and Winston Nettleton, Coordinator of Teacher Welfare, Alberta Teachers' Association. My sincere thanks for their time and effort.

Percentage of total school board budget devoted to instructional tasks was operationalized as the percentage of funds devoted to instructional tasks (INST), as a total of operating expenditures (net of capital transfers and debt servicing) as reported in the Financial and Statistical Report of Alberta School Jurisdictions. This report summarizes the audited financial statements filed annually with Alberta Education (Alberta Education, 1993). This information was obtained through Alberta Education, School Business Administration Services.

Increases in the wealth of the municipality was operationalized as the annual percentage change in the adjusted equalized tax assessment for each school board (TAX), as reported in the Financial and Statistical Report of Alberta School Jurisdictions. The adjusted equalized assessment represents the property tax base upon which the school board relies for its tax revenue.

Local support for the NDP was operationalized as the percentage of individuals voting (unspoiled ballots) for the NDP in the election most closely corresponding to the year in question (NDP). For the elections of 1982, 1986, and 1989, individual poll maps and results are available, and NDP vote was matched almost perfectly with the school districts. Such maps and results were not available for the 1979 election, and, as a result, the electoral riding that most closely coincides with the school district in question was used. Where city school boards were used or school board employers' associations exist, the percentage of individuals voting for the NDP in all ridings or polls that are geographically located within that city or employers' association are used. Provincial elections have been held in 1979, 1982, 1986 and 1989 and results were readily available (Province of Alberta, 1979, 1982, 1986, 1989).

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[51] All variables measured as annual changes will be based on the school year (September to August), unless otherwise noted.

[52] The ASBA feels confident that information provided by the ATA will be accurate, and vice-versa.

Funding for education in Alberta is obtained from local, provincial, and federal sources. Federal funding is received as compensation for instructing treaty Indians who attend schools funded by the Province. This funding comprised only 1.8% of total expenditures for elementary and secondary education in the province in 1991 (Alberta Education, 1993). For this reason, funding increases from higher levels of government will be restricted to the Province which provided approximately 58% (1991) of all elementary and secondary school funding in the province. Funding increases from higher levels of government was operationalized as the annual percentage change in per pupil grants provided to the school board by the Provincial government (SUP). This information was obtained from Alberta Education, Grants Planning and Administration Branch.

Total funding from higher levels of government, as a percentage of total school board funding, was operationalized as the total funding received from the provincial government for operational purposes for the school year, as a percentage of total operational funding (non-capital spending), as reported in the Financial and Statistical Report of Alberta School Jurisdictions (PROV).

Changes in pupil teacher ratios were operationalized as the annual percentage change in the pupil teacher ratio for the school board or employer's association (PTR).

This information was obtained from the ASBA, but is only available for the school years starting in 1983-84. Alternate models are run with and without this variable due to the unavailability of data prior to 1983-84.

The unemployment rate was operationalized as the average percentage of the workforce looking for work in Alberta as reported by Statistics Canada for the calendar year in which the school year begins (UNEM). This information was obtained from the Statistics Canada publication The Labour Force Annual Averages (catalogue No. 71-529). This information is available for each "economic region" (as defined by Statistics Canada).

The rate of inflation was operationalized as the annual percentage change in the consumer price index (CPI) for Alberta (seasonally unadjusted) as reported by Statistics Canada for the calendar year in which the school year begins. This information is available in the Statistics Canada publication Consumer Prices and Price Indices (catalogue No. 62-010). It has been suggested that where collective bargaining is involved, CPI should be measured as both a catch-up of cost of living (if any) from the previous contract and expected inflation (Jenkins, 1980). To calculate such a measure one must know the signing date of the collective agreements or their effective dates. As such information is not available, we must satisfy ourselves with the year over year rate.

Wage changes for all workers in the same geographic area were operationalized as the percentage change in average wages for all workers in Alberta (seasonally adjusted) as reported by Statistics Canada for the calendar year in which the school year begins (PWAGE). This information is available in the Statistics Canada publication Employment, Earnings, and Hours (catalogue No. 72-002).

Change in total school board enrollment was operationalized as annual percentage change in total full-time-equivalent enrollment as reported in Alberta Education's annual reports (ENROL). Full-time-equivalent enrollment is defined as the sum of all individuals attending grades one through twelve, inclusive. Alberta Education's annual reports are available from the Alberta Education library.

A lawful work stoppage in a prior round of collective bargaining was operationalized as a dichotomous variable (PSTRIKE). The variable equals one if a work stoppage was experienced in the round of collective bargaining prior to the one from which the current collective agreement resulted, and zero otherwise. The current legal work stoppage variable was also operationalized as a dichotomous variable (STRIKE). It equals one if a work stoppage occurred during collective bargaining for the current contract, and zero otherwise. Work stoppage length was defined as the number of school days lost during a work stoppage (LENGTH). The number of school days, as opposed to calendar days, should be the most appropriate measure as strikes during non-working times (e.g., summer or Easter holidays) should have little influence on bargaining outcomes (there is no lost "production"). All strike data was provided by the ATA.

VII. DATA ANALYSIS

Data were obtained from secondary sources for all years and school boards that employed teachers from 1978 to 1991. The exception, as noted in Chapter 6, is the pupil teacher ratio data which were only available for the years 1983 to 1991. As the data analysis is concerned with first differences (i.e. year over year changes), the greatest number of observations possible for any given school board or bargaining group is thirteen (1991-1978=13), while for the smaller data set (with pupil teacher ratios), the maximum number of possible observations per school board is eight (1991-1983=8).

Over the time span in question, slightly in excess of one hundred school boards or bargaining groups existed at one time or another. Some of these school boards existed for a very short duration. Any school board that did not have three consecutive usable data points was dropped from the data set as it was felt that these transitory bargaining relationships would do little to help explain the nature of the long term relationships that dominate teacher collective bargaining in Alberta (most school boards or bargaining groups had a complete data set for the entire time period). For this reason, there were approximately twenty possible data points that were dropped from the full data set. In the full data set (SET 1) 1034 observations were obtained while the data set (SET 2) that included the pupil teacher ratio data contained 666 observations.

(1) Correlation Coefficients

Table 7-1 provides a description of the variables and their abbreviations while Table 7-2 reports the means and standard deviations of the variables included in the analysis, while Tables 7-3 (SET 1) and 7-4 (SET 2) report the correlation matrices. Some interesting relationships are reported in these latter two tables. In both data sets, CMIN, CMAX, and CAVG are all highly and positively correlated. For the sake of

TABLE 7-1

Variable	Abbreviation
Dependent Variables:	
% Change in starting pay rate for teachers with four years education	CMIN
% Change in maximum pay rate for teachers with four years education	CMAX
% Change in average of minimum and maximum pay rates for teachers with four years of education	CAVG
Independent Variables:	
% Change in the consumer price index	CPI
% Change in school board enrollment	ENROL
Instructional spending as a % of total school board budget	INST
Length of strike	LENGTH
% Support for NDP candidate(s) within each school district	NDP
Provincial support as a % of total school board budget	PROV
Strike in the previous round of collective bargaining	PSTRIKE
% Change in pupil teacher ratio	PTR
% Change in average provincial wage	PWAGE
Occurrence of a strike	STRIKE
% Change in per student support from the provincial government	SUP
% Change in the size of a school board's tax base	TAX
Unemployment rate (%)	UNEM

TABLE 7-2

	SET 1		SET 2	
	Average	Standard Dev.	Average	Standard Dev.
CMIN	5.89	4.32	3.61	2.14
CMAX	5.94	4.30	3.60	2.08
CAVG	5.92	4.29	3.60	2.09
CPI	5.98	3.28	3.98	1.21
ENROL	0.90	8.20	1.15	8.96
INST	62.87	7.42	61.90	7.20
NDP	23.19	10.38	25.57	9.58
PROV	68.05	10.03	65.62	9.65
PWAGE	5.23	5.14	3.10	2.14
SUP	4.90	4.93	2.29	2.09
TAX	12.40	22.42	3.36	12.01
UNEM	7.45	2.36	8.37	1.70
STRIKE	0.03	0.17	0.04	0.19
PSTRIKE	0.02	0.13	0.02	0.14
LENGTH	0.37	2.80	0.37	2.41
PTR			-0.03	8.49

Table 7-3

Correlation Matrix
(Full Model)

	CMIN	CMAX	CAVG	CPI	ENROL	INST	LENGTH	NDP	PROV	PSTRIKE	PWAGE	STRIKE	SUP	TAX	UNEM
CMIN	1.00	0.98	0.99	0.88	0.00	0.09	-0.02	-0.24	0.15	-0.03	0.76	-0.06	0.69	0.49	-0.54
	0.00	0.00	0.00	0.00	0.98	0.00	0.62	0.00	0.00	0.29	0.00	0.04	0.00	0.00	0.00
CMAX		1.00	0.99	0.90	-0.01	0.11	-0.02	-0.25	0.17	-0.03	0.79	-0.07	0.71	0.50	-0.57
		0.00	0.00	0.00	0.81	0.00	0.58	0.00	0.00	0.26	0.00	0.03	0.00	0.00	0.00
CAVG			1.00	0.89	-0.00	0.10	-0.02	-0.25	0.16	-0.04	0.78	-0.07	0.70	0.49	-0.55
			0.00	0.00	0.82	0.00	0.60	0.00	0.00	0.22	0.00	0.03	0.00	0.00	0.00
CPI				1.00	0.01	0.17	0.00	-0.27	0.22	-0.03	0.85	-0.06	0.81	0.60	-0.68
				0.00	0.80	0.00	0.88	0.00	0.00	0.28	0.00	0.05	0.00	0.00	0.00
ENROL					1.00	-0.10	-0.03	-0.02	0.04	-0.00	0.02	-0.04	0.00	0.02	0.01
					0.00	0.00	0.28	0.56	0.16	0.90	0.63	0.23	0.97	0.53	0.82
INST						1.00	-0.03	-0.19	0.13	-0.04	0.14	-0.04	0.15	0.06	-0.20
						0.00	0.37	0.00	0.00	0.23	0.00	0.18	0.00	0.06	0.00
LENGTH							1.00	-0.01	-0.03	-0.02	0.00	0.74	0.01	-0.03	0.01
							0.00	0.66	0.31	0.58	0.92	0.00	0.69	0.40	0.79
NDP								1.00	-0.09	0.05	-0.19	0.08	-0.23	-0.16	0.23
								0.00	0.00	0.13	0.00	0.01	0.00	0.00	0.00
PROV									1.00	-0.01	0.18	-0.03	0.24	0.19	-0.17
									0.00	0.68	0.00	0.33	0.00	0.00	0.00
PSTRIKE										1.00	-0.02	-0.02	-0.02	-0.04	0.04
										0.00	0.43	0.45	0.47	0.24	0.18
PWAGE											1.00	-0.05	0.72	0.46	-0.77
											0.00	0.14	0.00	0.00	0.00
STRIKE												1.00	-0.05	-0.07	0.07
												0.00	0.09	0.03	0.02
SUP													1.00	0.61	-0.71
													0.00	0.00	0.00
TAX														1.00	-0.47
														0.00	0.00
UNEM															1.00
															0.00

TABLE 7-4

Correlation Matrix
All boards with PTR data

	CMIN	CMAX	CAVG	CPI	ENROL	INST	LENGTH	NDP	PROV	PSTRIKE	PTR	PWAGE	STRIKE	SUP	TAX	UNEM
CMIN	1.00	0.97	0.99	0.49	0.07	-0.03	-0.01	-0.02	-0.22	-0.01	-0.05	0.57	0.01	0.33	0.05	-0.33
	0.00	0.00	0.00	0.00	0.07	0.41	0.79	0.56	0.00	0.82	0.22	0.00	0.90	0.00	0.18	0.00
CMAX		1.00	0.99	0.51	0.07	-0.02	-0.01	-0.02	-0.22	-0.01	-0.07	0.59	0.00	0.33	0.06	-0.35
		0.00	0.00	0.00	0.07	0.54	0.72	0.55	0.00	0.83	0.08	0.00	0.99	0.00	0.13	0.00
CAVG			1.00	0.51	0.07	-0.03	-0.01	-0.02	-0.22	-0.01	-0.06	0.59	0.00	0.33	0.06	-0.34
			0.00	0.00	0.07	0.48	0.75	0.55	0.00	0.82	0.12	0.00	0.95	0.00	0.14	0.00
CPI				1.00	0.15	0.06	0.01	-0.05	-0.25	-0.01	0.08	0.74	0.02	0.08	0.17	-0.37
				0.00	0.00	0.11	0.85	0.21	0.00	0.83	0.05	0.00	0.58	0.05	0.00	0.00
ENROL					1.00	-0.03	-0.04	-0.04	0.06	0.00	0.05	0.15	-0.04	0.04	0.01	-0.05
					0.00	0.39	0.29	0.30	0.11	0.98	0.20	0.00	0.26	0.25	0.77	0.24
INST						1.00	-0.05	-0.19	-0.01	-0.05	-0.01	0.05	-0.03	0.00	-0.07	-0.09
						0.00	0.21	0.00	0.86	0.19	0.84	0.23	0.51	0.99	0.09	0.02
LENGTH							1.00	0.02	-0.01	-0.02	-0.00	-0.01	0.77	-0.01	-0.01	0.07
							0.00	0.57	0.81	0.56	0.95	0.75	0.00	0.72	0.79	0.09
NDP								1.00	0.00	0.05	0.02	-0.06	0.07	-0.03	-0.02	0.13
								0.00	0.95	0.16	0.66	0.11	0.05	0.45	0.62	0.00
PROV									1.00	0.02	0.01	-0.23	-0.01	-0.02	-0.03	0.15
									0.00	0.52	0.76	0.00	0.87	0.55	0.44	0.00
PSTRIKE										1.00	-0.02	-0.02	-0.03	0.00	-0.04	0.04
										0.00	0.68	0.60	0.46	0.93	0.30	0.25
PTR											1.00	-0.04	0.00	-0.09	0.11	0.02
											0.00	0.37	0.90	0.02	0.00	0.64
PWAGE												1.00	0.02	0.63	0.11	-0.53
												0.00	0.62	0.00	0.00	0.00
STRIKE													1.00	0.03	-0.02	0.07
													0.00	0.48	0.60	0.05
SUP														1.00	-0.05	-0.40
														0.00	0.22	0.00
TAX															1.00	-0.15
															0.00	0.00
UNEM																1.00
																0.00

brevity and due to the fact that there are limited differences among the three variables, only the correlations between CAVG and the explanatory variables will be discussed although all correlation coefficients are reported in the correlation matrices.

With regard to CPI, a large positive and significant correlation exists between CPI and CAVG in both data sets. In SET 1 the correlations is .89 while in SET 2, the correlation between CPI and CAVG is .51. This finding is not unexpected as all those interviewed believe that CPI was the most significant factor in determining wage increases. The reason for the change in the coefficient will become evident as further analysis is undertaken.

Although PROV and CAVG are positively and significantly related to one another in SET 1 ($\rho=0.15$), in SET 2 the relationship is significant and negative ($\rho=-0.27$). It is quite clear that this relationship is not stable over the length of the data set.

In SET 1 the correlation coefficient between NDP and CAVG is significant and negative at the 1% level while in SET 2 the correlation coefficient continues to be negative but it is insignificant. This runs counter to the expectations of the study. This may be the result of the fact that the percentage of the population voting for the NDP steadily increased over the years covered in the study while wage increases (and CPI) steadily declined in magnitude.[53] The correlation in SET 1 between year and CAVG is -0.50, which is significant at the 1% level (wage increases have been steadily declining). There may not be any causality in the relationship between increased NDP support and the decline in teacher wage increases. When CPI is controlled for, the correlation between NDP and CAVG is -0.02 in SET 1 while it is 0.01 in SET 2. As can be seen there appears to no relationship between these two variables.

The correlation coefficient between CAVG and PWAGE is large and significant in both data sets generally supporting the supposition that there is a positive relationship between the two variables. The coefficient is 0.79 in SET 1 and 0.59 in SET 2 indicating that there may be a strong relationship between increases in teacher pay and the increased earning power of workers in the province as a whole. This may indicate that teachers have been able to share in the increased prosperity of the province as a whole and suffered when workers as a whole have suffered. PWAGE is also highly correlated with CPI, as expected (ρ= 0.85 and 0.74).

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[53] In 1979 15.75% of the votes cast in the Alberta provincial election were cast in favour of the NDP. This percentage increased to 18.75% and 29.22% of votes cast in the 1982 and 1986 elections, respectively. This number declined slightly to 26.90% in the 1989 election.

The SUP variable, which is the increase in per capita student grants, was expected to have a positive relationship with changes in teacher pay. The relationship between the two was positive in both data sets and significant at the 1% level in both data sets although the relationship was not as strong as the relationship between CPI and CAVG (ρ= 0.70 and 0.33 for SUP versus ρ=0.90 and 0.51 for CPI).

The relationship between TAX and CAVG is consistent. In both data sets the relationship between the two variables is positive, as expected, but only in SET 1 is the coefficient of correlation significant (1%). Finally, the relationship between UNEM and CAVG is significant at the 1% level and negative in both data sets. The correlation coefficient is -0.56 in SET 1 while in SET 2 it is -0.34. These last three relationships (CAVG versus UNEM, TAX, and SUP) are encouraging, suggesting that ability to pay will be an important factor in the regression analysis. The TAX and SUP variables are designed to speak directly to the availability of funds to the school board while the UNEM variable provides a wage increase modifier reflecting the general status of the labour market.

The variables utilized in an attempt to capture the effects of strike behaviour on bargaining outcomes initially appear to have no relationship to increases in teacher pay. These variables include STRIKE, PSTRIKE, and LENGTH. The correlation coefficients between CAVG and these three variables are generally insignificant and of mixed signs. This initially may indicate that strike activity is used in a "responsible" or "defensive" manner. In other words, it may be the case that teachers strike merely to enforce a settlement consistent with the patterns already established across the province. In turn, this may indicate that any school board that attempts to break from the norms already established by enduring a strike may be expending effort for naught. On the other hand, if a work stoppage is undertaken to increase the wage offer above the norm, then teachers will expend effort for nothing. Coupled with the political ramifications to the local school board of a teacher strike, a finding that school boards are unable to alter settlements by enduring a strike would not be surprising. Settling for the established norm may be the best solution to threatened strikes under current circumstances. On the other hand, the failure to control for CPI may obscure the relationship between strike activity and wage increases.

An inability to alter bargaining outcomes through strike activity may also indicate that the government's current strategy of cutting grants by 5% of salaries may not easily translate into pay cuts to teacher salaries. If it does not translate into pay cuts to teachers, the school boards will be forced to layoff teachers or increase local property tax rates, as school boards are not permitted to run operational deficits under their governing legislation.[54] This only leaves the option of laying off teachers and increasing class sizes. Job losses had been proposed by the Edmonton Public School Board to deal with its loss of funding (Edmonton Journal, January 26, 1994).

The correlation between the pupil teacher ratio (PTR) variable and the wage increase variables are all negative and contrary to expectations; except for one of the three measures of wage increase, the correlation coefficient is insignificant at the 10% level. This may be due to the fact that smaller school boards may not be able to manipulate their PTRs in a meaningful way in the short term (discussed below) and the fact that there is no control for CPI in a correlation analysis thereby obscuring the true relationship.

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[54] School boards are only able to incur debt to finance capital projects (see the School Act). With regard to tax increases, it appears that boards will lose their taxation power under a proposed restructuring by the Alberta Government (Edmonton Journal, January 19, 1994).

Although the remaining variables such as ENROL and INST do not seem to have a consistent and significant relationship to increases in teacher pay, it is positive that so many of the economic variables do have a strong relationship with increases in teacher pay.

(2) Regression Results: SET 1

Data SET 1 consists of 1034 observations gleaned from the period 1978 to 1991 from all school boards across the province. The F-Statistics for the three regressions range from 315 to 404 (significant at the 0.01% level), lending great confidence to the regression results, while the R^2s range from a low of 0.79 to a high of 0.83 (see Table 7-5). White's test for heteroskedasticity shows that there is a potential problem, but the results are none-the-less unbiased.[55] White's heteroskedastistic consistent estimates of the standard errors are used to determine the level of significance.

(a) Ability to Pay

When testing Hypothesis 1, the TAX variable has a negative sign and is significant at the 5% level in all three regression analyses. This is, of course, contrary to expectations and there appears to be no intervening variables to explain this anomaly leaving one inclined to believe that this "significant" finding is unexplainable and not significant if a one-tailed t-test is applied. From Table 7-3 we can see that there is a strong positive correlation between TAX and CAVG (ρ=0.49 -- 1%) but it appears that when other variables are taken into account, most probably CPI, the relationship breaks down. The partial correlation between TAX and CAVG, when controlling for CPI is negative and significant (ρ=-0.12, 1%). This result may be due to the fact that teachers have been able to enforce wage increases without regard to the tax base, as they are

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[55] See Jobson (1991) for and explanation of White's test.

TABLE 7-5

Full Model (n=1034)

Dep. Var.	CAVG	CMIN	CMAX
Intercept	-1.161	-0.889	-1.325c
CPI	1.154a	1.162a	1.150a
ENROL	-0.011	-0.008	-0.023c
INST	-0.023a	-0.026a	-0.022a
NDP	-0.009	-0.008	-0.010c
PROV	-0.011c	-0.016a	-0.007
PWAGE	0.134a	0.118a	0.143a
SUP	0.006	0.019	-0.001
TAX	-0.008a	-0.008a	-0.008b
UNEM	0.267a	0.292a	0.252a
STRIKE	-0.277	-0.249	-0.294
PSTRIKE	-0.260	-0.257	-0.264
LENGTH	-0.028	-0.028	-0.027
F-Stat	385.8	315.6	404.4
(Prob.)	0.0001	0.0001	0.0001
R-Squared	0.8193	0.7876	0.8262
AR-Squared	0.8172	0.7852	0.8241

Legend: a-significant at 1%; b-sig. at 5%; c-sig. at 10%.
AR-Squared: Adjusted R-Squared

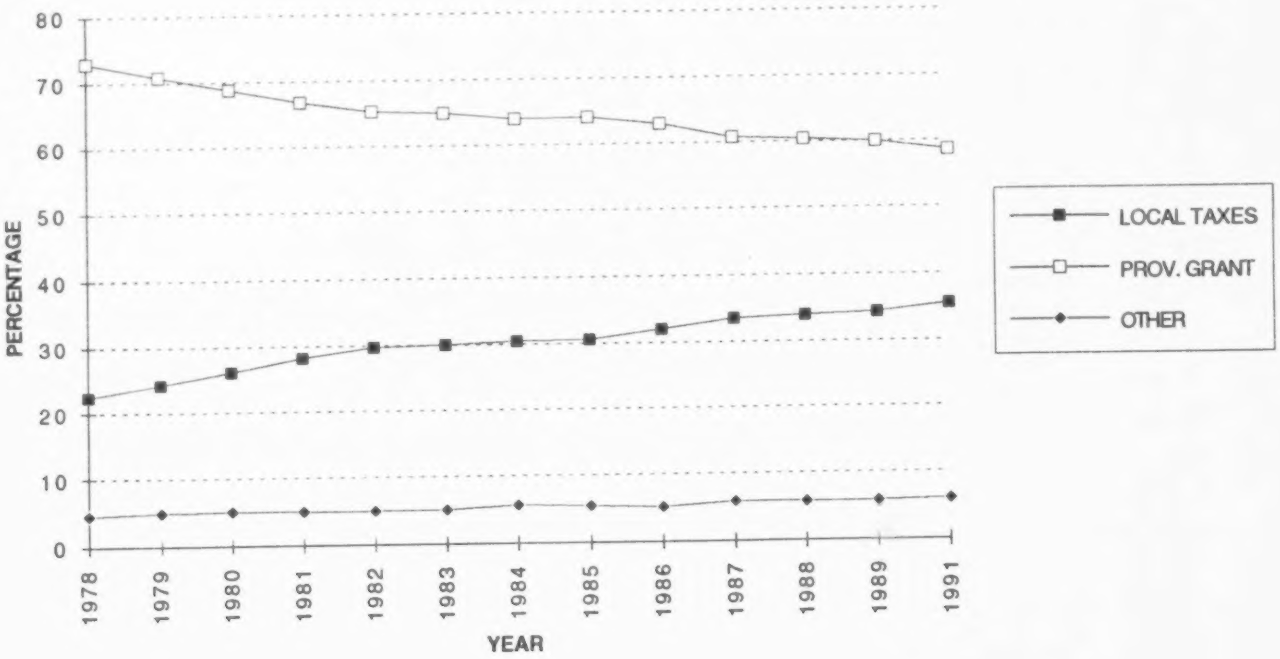
more concerned with maintaining wages relative to CPI than allowing for local conditions (ability to pay) to dictate wage raises. The variable PROV (Hypotheses 2B--reliance on the Province for funding), although significant and negative at the 10% level when the dependent variable is CAVG and significant at the 1% level when the dependent variable is defined as CMIN, suffers from a similar problem to the NDP variable: a systematic change in the variable over time. Over time there has been an increasing reliance on the local tax base for funding grade school education in the province (see Graph 7-1). Those school boards that appear to be unable or unwilling to assume an increasing portion of the cost of education appear to be falling behind the remaining school boards. Simple OLS does not control for this change over time.

With regard to the INST variable, -- which is used to test Hypothesis 4, the hypothesis related to the potential for budget substitution -- it was found to be significant at the 1% level and of the appropriate sign in all three regression analyses. The INST coefficients were negative in all three regression analysis indicating that as the percentage of a school board's budget devoted exclusively to teaching tasks grow, the size of teacher wage increases falls. Even though this is not consistent with the simple correlations, this is not a terribly surprising finding once CPI is accounted for. It is much easier to reduce expenditures on maintenance than salary costs, due to the nature of collective bargaining in this field.

Of course, with the 1994 announcement that provincial grants to school boards would be cut by 5% of salary costs and the fact that the school boards were left to their own devices as to how obtain these savings, this trend will likely continue. Those school boards that devote a smaller percentage of their budget towards teaching may decrease expenditures in other areas, thereby increasing the percentage of their budget devoted to teaching, in order to free up funds to decrease pressures in the salary area. Such cross-substitution may have a critical role to play as school boards grapple with their new budgetary constraints and may force school boards to operate in a more

Graph 7-1

REVENUE DISTRIBUTION



efficient manner, if possible, or to defer the purchase of materials. For example, possible savings may be available in the integration of the public and separate school systems' administration or transportation practices. Grant reductions may force the ATA and each school board to set budgets jointly as they look for money for salaries. This would be similar to the process described by Craft (1970) in California. Such a development would also be consistent with the belief that unions may have the effect of forcing employers to operate in a more efficient manner in order to pay higher wages (Freeman and Medoff, 1984). It may also be possible that spending reductions in non-instructional areas are reducing service delivery in those areas.

The remaining two variables dealing with ability to pay, ENROL (enrollment) and SUP (percentage increase in per student grants), have the appropriate sign, negative and positive respectively, except that SUP had a negative sign when the dependent variable is defined as CMAX.[56] In only one case were these variables significant at the 10% level. This occurred for ENROL when the dependent variable was defined as CMAX. Drawing any conclusions from this single (and weak) result would be highly questionable.

(b) Willingness to Pay

The NDP variable (Hypothesis 5) was inconsistent with regards to significance and the coefficients' signs were negative, the reverse of what was posited in Hypothesis 5. Only when the dependent variable was defined as CMAX was the NDP variable significant and only at the 10% level of significance. As mentioned in the discussion of the correlation coefficients, it was observed that there appears to be an inverse relationship between year and votes for the New Democratic Party and a positive relationship between year and size of teacher wage increases. The result was that there is a negative correlation between size of wage increase and the NDP vote in a school board district.

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[56] In SET 1, SUP was the only variable that did not have a consistent sign.

On the face of it there is no reasonable explanation for this negative correlation. Although the NDP variable is of an unanticipated sign and not significant in two of the three regressions, there may be an interesting interpretation to the results. The coefficient of NDP is negative and significant at the 10% level when the dependent variable is defined as CMAX. This may be consistent with New Democratic Party or socialist principles. It may say that increasing relative support for the NDP could be associated with reduced wage increases for those teachers at the top of the pay scale. As the average maximum ATA wage was approximately $967 a week in 1991 and the average Alberta wage was $548 (Statistics Canada No. 72-002), it is conceivable that areas with relatively high NDP support are not sympathetic to those teachers at the top of the pay scale and thereby more likely to give flat raises (e.g., $1000 across the board) rather than straight percentage wage increases.

(c) General Economic Conditions

The regression coefficients for CPI are probably the most striking (but not necessarily surprising) results of the study. In all three regression equations the CPI coefficient is strongly significant, well in excess of the 1% level, and positive, as expected. What is of further interest is the fact that the CPI coefficient averages 1.155, and varies little across the regressions, strongly supporting Hypothesis 8.[57] It appears that over the time period in question not only have teachers been able to keep up with general inflationary pressures but have managed to exact a premium over inflation during the period in question.

Hypothesis 6, as measured by the variable PWAGE, is strongly supported by the regression analysis of SET 1. In all three of the regressions, change in the average provincial wage is significant at the 1% level, displays the appropriate sign (positive) and averages 0.1315. This could indicate that teachers have been influenced by growth and reduction in wages across the province.

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[57] A 95% confidence interval for the coefficient of CPI, when the dependent variable is defined as CAVG, is (1.07, 1.24) indicating a strong probability that the coefficient is greater than one.

The UNEM variable, the measure of unemployment -- Hypothesis 7--, was significant at the 1% level in all three regression analysis, had a positive sign, and the coefficient was rather large. This result is rather puzzling. The correlation between the year and the unemployment rate is 0.43, the correlation between year and CAVG is -0.51, and the correlation between CAVG and UNEM is -0.56 (all significant at the 1% level). In other words, unemployment has generally been on the increase while inflation, and consequently wage increases have been falling during 1978-91, indicating that an inverse relationship could easily be expected but was not found.

Prior to the regression analysis all indications were of an inverse relationship between increases in teacher wages and the unemployment rate. One cannot even explain away this problem due to other unrelated trends, as was done with another variable where the coefficients were of an unexpected sign (i.e., NDP). Unemployment of the population at large has generally increased from 1978 to 1991, while wage increases have decreased, as one might expect, but when other variables are taken into account in the regression analysis, the OLS results do not display this relationship. This could be interpreted to mean that teachers have been shielded from the consequences of a poor labour market: wages that fail to keep up with inflation. A discussion of the teacher sub-labour market will be discussed in the next chapter.

(d) Work Stoppages

None of the variables that were associated with strike activity (PSTRIKE, STRIKE, and LENGTH--Hypothesis 10, 11A and 11B) had the anticipated sign (all were negative), and none were significant. This "non-finding" is actually very interesting from a societal point of view and from a collective bargaining/public policy point of view. Such a finding could indicate that the strike weapon is used to maintain the status quo and not to extract anything more from the school board than would be expected in any other jurisdiction.

This has two important implications. The first is for the school boards. If they wish to extract the 5% salary funding cut that the Province has handed the school boards, collective bargaining at the local level is unlikely to be able to involuntarily extract pay cuts from teachers. Unless some fundamental change to the public policy regime comes about it is unlikely that school boards will have much, if any, success in reducing teachers' wages. The decision as to pay cuts or job losses to make up the shortfall will remain in the hands of teachers. The second implication is that a lot of acrimony could be avoided on both sides of the bargaining table if the parties could agree to participate in binding arbitration rather than suffering a strike/lockout.[58] Imposing an "average" agreement would likely create the same outcome as if a strike were undertaken (based on these results), and arbitrators are known for imposing "normal" or average outcomes (Olson and Jarley, 1991). The Province may also wish to consider removing the right to strike for teachers and replace it with binding arbitration.

(e) Other Issues

When the largest outliers were examined, a very significant trend was observed. When the dependent variable was CAVG, for example, of the 52 observations that had a residual less than -3, only eight had a CAVG in excess of 1.1%. Where the estimated values of CAVG are significantly larger than the actual observed values of CAVG, they are overwhelmingly associated with small or no wage increases. Of the 102 observations where CAVG was less than 1.1%, the average residual is -2.48 with a maximum value of 0.41 and minimum value of -6.78. Only one observation of the 102 had a positive residual (0.41). It appears that the model is unable to account for these small bargaining outcomes.

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[58] The only difference is that costs would be incurred by both parties to undertake the arbitration process, and school boards would not save on salary costs as they would during a strike.

In retrospect this finding is consistent with many of the recent theories of collective bargaining which is summarized in Kochan et al.'s (1988) The Transformation of American Industrial Relations:

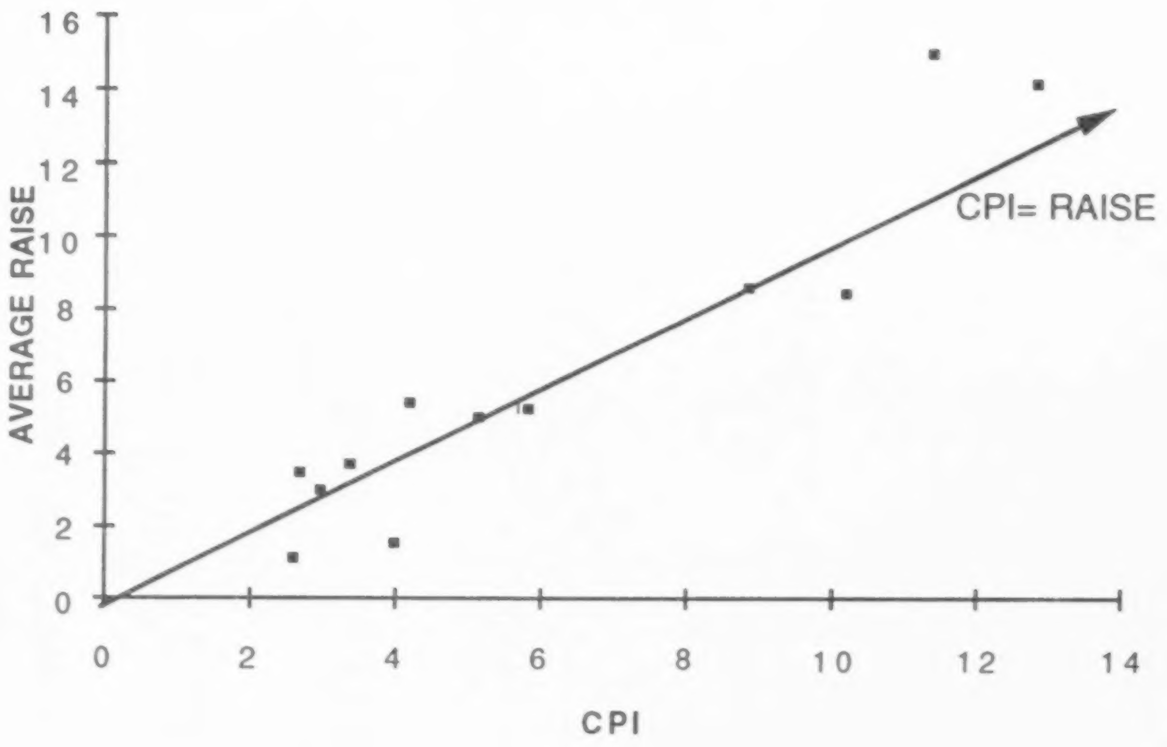
> the aggregate impacts of wage concessions have been to lower the rate of wage increases negotiated under collective bargaining by between 1 and 3 percent compared to what they would have been if the trends of the pre-1980s had continued. (p.116)

It can easily be considered that by public-sector collective bargaining standards a wage freeze (or near wage freeze) represents a significant break from the past, as concession bargaining in the public-sector has probably been less of a force than it has been for private-sector workers (Mitchell, 1986). During the last twenty years, unionized public-sector workers have been accustomed to regular wage increases. It is not surprising to find the model overestimating the dependent variable when small values are observed. It seems to suggest that one must convince the ATA to ignore the past determinants of collective bargaining and that certain new exigencies exist, and such situations have occurred.

This may have to do with the median voter model. This model posits that the preferred wage of the median voter (as determined by seniority) makes a decision based on the threat of layoff and the size of strike costs (Kaufman, 1986). Where a school board can convince the median voter that large strike costs will be imposed if an offer is not accepted, it may be able to get these small wage increases accepted.

It was also discovered, merely by observing a scatter-plot of CAVG versus CPI, that the relationship may be non-linear. It appears that CPI may be positively related to

CPI v. AVERAGE RAISE



CAVG at an increasing rate. Graph 7-2 shows a plot of CPI versus the average wage increases from 1978 to 1991. Although there is not an overwhelming trend, one may be able to discern that it seems more likely for wage increases to lag CPI when CPI is small and lead CPI when CPI is large.

As a result of these two factors, a second regression analysis was run in order to capture this non-linearity and also to drop those small values of the dependent variable. The results are reported in Table 7-6. For those variables that were significant and of the appropriate sign in the initial set of regressions, the second set of regressions provide remarkably similar result in terms of the significance of the variables and the magnitude of their coefficients. Of course the exception is the variable SCPI (CPI squared), which is smaller than the coefficients for CPI for obvious reasons.

Another problem is clearly evident in the regression analysis. The ratio of the largest eigenvalue to the smallest eigenvalue for the regressions is 1723 in the first model, while in the second model it is 1796, well in excess of the threshold value 1000 (Jobson, 1991), indicating that multicollinearity is severe. This could cause variables to be insignificant when they are in fact significant, or vice-versa, and potentially reverse the sign of its related coefficient.[59]

The possible options to deal with multicollinearity are to increase the number of observations, drop explanatory variables (Jobson, 1991) or use principle component analysis (Jenkins, 1980). As increasing the number of observations is not easily accomplished (a census of this jurisdiction was undertaken rather than a sample and obtaining observations from another similar jurisdiction would be difficult), dropping variables may provide a solution. Prime candidates are those that are highly correlated with other explanatory variables. A principle component analysis was also undertaken. Table 7-7 provides the correlations between the four principle components derived and the explanatory variables.

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[59] It should be noted that these problems **may** occur but do not necessarily occur.

TABLE 7-6

Modified Full Model (n=932)

Dep. Var.	CAVG	CMIN	CMAX
Intercept	2.618a	2.993a	2.395a
SCPI	0.083a	0.084a	0.083a
ENROL	-0.010	-0.006	-0.013b
INST	-0.017b	-0.020b	-0.016b
NDP	-0.009	-0.007	-0.010b
PROV	-0.006	-0.013b	-0.002
PWAGE	0.109a	0.091a	0.121a
SUP	-0.133a	-0.123a	-0.138a
TAX	-0.004	-0.004	-0.004
UNEM	0.218a	0.241a	0.204a
STRIKE	0.008	0.014	0.004
PSTRIKE	-0.209	-0.203	-0.214
LENGTH	-0.037	-0.037	-0.037
F-Stat	476.8	363.1	502.2
(Prob.)	0.0001	0.0001	0.0001
R-Squared	0.8616	0.8258	0.8677
AR-Squared	0.8598	0.8235	0.8659

Legend: a-significant at 1%; b-sig. at 5%; c-sig. at 10%.
AR-Squared: Adjusted R-Squared

TABLE 7-7

Principle Component Analysis

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4
TAX	0.70	0.00	0.17	0.00
NDP	-0.35	0.04	0.45	-0.29
SUP	0.89	0.06	0.09	-0.05
PROV	0.32	-0.04	-0.15	0.34
PWAGE	0.88	0.06	0.12	-0.09
UNEM	-0.84	-0.03	-0.03	0.08
CPI	0.92	0.05	0.08	-0.04
ENROL	0.01	-0.08	0.47	0.72
INST	0.25	-0.05	-0.75	0.00
STRIKE	-0.11	0.92	0.00	0.03
LENGTH	-0.03	0.93	-0.03	0.04
PSTRIK	-0.05	-0.05	0.26	-0.53

FACTOR	EIGENVAL.	% VAR	CUM %
1	3.91	32.6	32.6
2	1.73	14.5	47.1
3	1.13	9.4	56.5
4	1.03	8.5	65.1
5	0.98	8.2	73.2

As the first principle component is so heavily correlated with CPI (at 0.92) we may remove other variables that are highly correlated with the first principle component without the risk of losing explanatory power. Keeping CPI would also be consistent with the information gleaned from the interviews. In addition, of the process variables only the strike variable is retained in an effort to cut down on variables.

The third set of regressions were run without the previously mentioned variables in order to check the validity of the results obtained in the previous regression. This exercise is undertaken not to improve the model but to demonstrate that the results for these variables are reliable, are not due to a multicollinearity problem, and are not sensitive to model specifications. These results are remarkably similar with one exception (see Table 7-8). The PROV variable takes on increasing significance. The eigenvalue ratio shrinks to an acceptable 614.

Once again SCPI (CPI squared) is positively and highly significantly (1%) related to collective bargaining outcomes (Hypothesis 8). Given a CAVG mean of 5.92 and a CPI mean of 6.27, having CPI increase by one percent from the mean can increase wage increases by approximately 0.96% or by about 16.2% of the average value of CAVG (14.9% = 0.97%/5.92%). Of course due to the fact that the relationship appears to be non-linear, this effect will become more pronounced as CPI increases. A decrease of one percent from the mean CPI translates into a drop in wage increases of 0.81% or 13.7% of the average value of CAVG, and of course this number will drop with each drop in CPI.

The variable INST (Hypothesis 4) is consistently significant in all of the last six regressions, lending great confidence that this variable places a constraint on collective bargaining outcomes. In the last set of regressions the variable is significant at the 5% level or better in all regressions and the coefficient averages -0.021.

TABLE 7-8

Modified Model (n=932)

Dep. Var.	CAVG	CMIN	CMAX
Intercept	4.803a	5.463a	4.412a
SCPI	0.075a	0.074a	0.075a
ENROL	-0.008	-0.005	-0.011
INST	-0.020a	-0.024a	-0.019b
PROV	-0.010b	-0.017a	-0.006
STRIKE	-0.387	-0.385	-0.390
F-Stat	966.7	760.1	1009.7
(Prob.)	0.0001	0.0001	0.0001
R-Squared	0.8392	0.8041	0.8450
AR-Squared	0.8384	0.8030	0.8442

Legend:
a-significant at 1%; b-sig. at 5%; c-sig. at 10%;
AR-Squared: Adjusted R-Squared

(3) Regression Results: SET 2

The F-value for these three regressions drops substantially (27.1 to 31.2) as does the R^2s (0.35 to 0.38) versus the results from SET 1 (see Table 7-9). Clearly the predictive value of the model is not as strong as time progresses (i.e., during 1979-1991 versus 1984-1991), although most of the explanatory variables that were significant and of the appropriate sign continue to be so.[60] Some of the signs of the remaining coefficients change to the signs anticipated in Chapter 6, but they remain not significantly different from zero.

When observing Graph 7-3 and Graph 7-4 the reason for the drop in the R^2s becomes somewhat evident. Each graph indexes each variable at 1978 = 100 and controls for the effects of inflation. Several interesting trends may be observed from the graphs. First, from 1978 to 1991 the average starting and top salaries across the province track almost perfectly with CPI. The correlation coefficient between average starting and maximum salaries and the consumer price index is 0.99826 and 0.99822, respectively. Couple this with the fact that there is increasing disparity in teacher pay across the province, as shown in Graphs 7-3, 7-4, and 7-5, then the reason for the loss of predictive power for the model (primarily attributable to CPI's loss of explanatory power) becomes evident.

Graph 7-5 provides the ratios of the lowest to highest paid teachers across the province both for starting and maximum salaries. In 1978 the ratio for starting salaries (four years of education) from the lowest paid to highest paid teachers was 0.946 while the ratio of the maximum salaries was 0.925. By 1991 these ratios had become 0.772 and 0.806. Graphs 7-3 and 7-4 index all variables to 100 for 1978 to illustrate how average grid salaries, average provincial wage, and highest and lowest paid teachers have done (relatively) over the period of this study. If one observes the break down in the relationship in Graphs 7-3 and 7-4 it becomes clear that this occurs sometime in the

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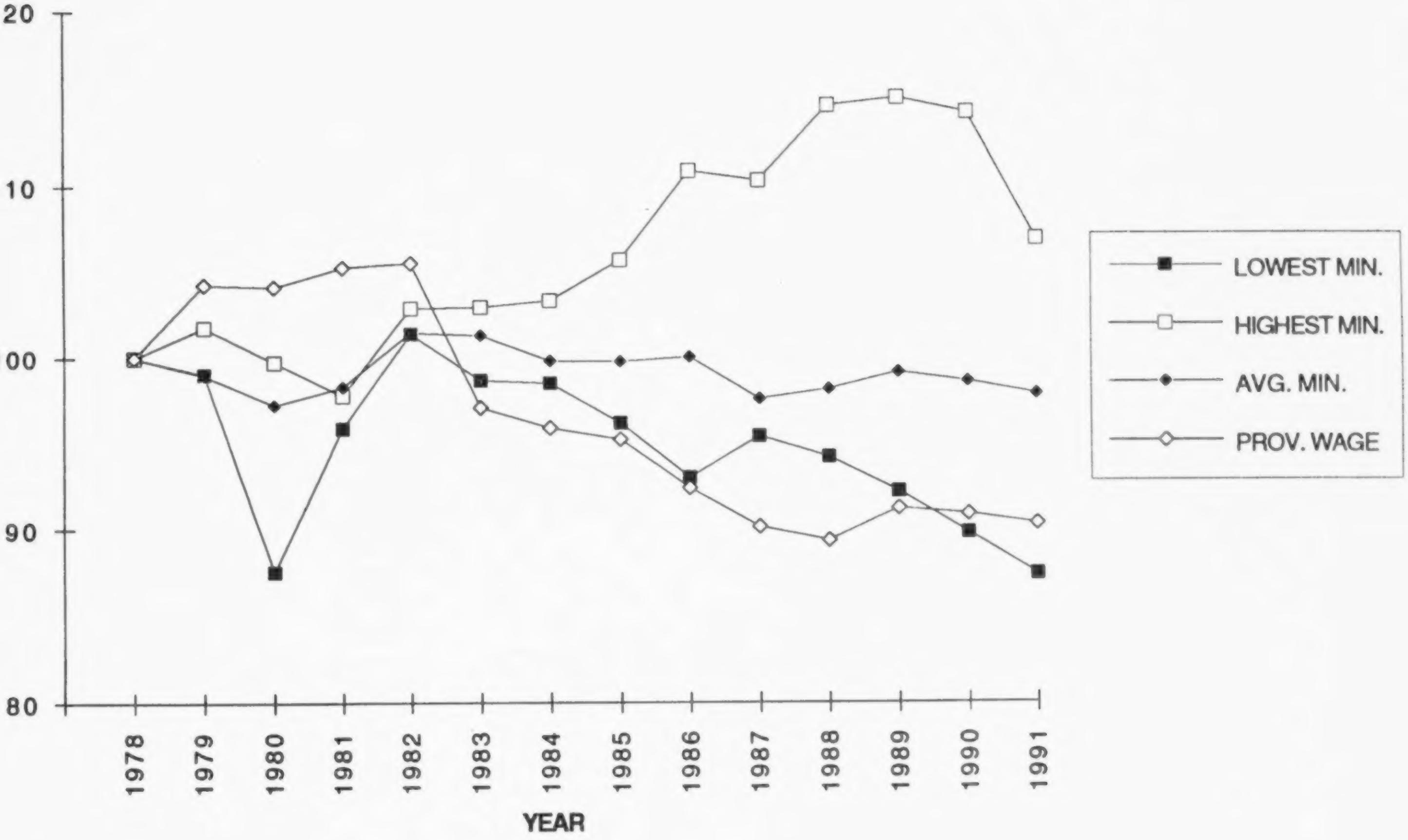
[60] Once again, White's heteroskedastistic consistent estimates of the standard errors are used to determine levels of significance.

TABLE 7-9
PTR Model (n=666)

Dep. Var.	CAVG	CMIN	CMAX
Intercept	3.384a	3.667a	3.209a
CPI	0.489a	0.466a	0.503a
ENROL	-0.003	-0.003	-0.004
INST	-0.019c	-0.020c	-0.018c
NDP	0.001	0.000	0.000
PROV	-0.017b	-0.019b	-0.016b
PTR	-0.014c	-0.011	-0.011b
PWAGE	0.256a	0.261a	0.254a
SUP	0.118b	0.120b	0.116b
TAX	-0.004	-0.004	-0.004
UNEM	-0.063	-0.056	-0.066
STRIKE	-0.079	-0.035	-0.105
PSTRIKE	-0.030	-0.034	-0.028
LENGTH	-0.005	-0.007	-0.004
F-Stat	30.2	27.1	31.2
(Prob.)	0.0001	0.0001	0.0001
R-Squared	0.3759	0.3512	0.3835
AR-Squared	0.3634	0.3382	0.3712

Legend: a-significant at 1%; b-sig. at 5%; c-sig. at 10%.
AR-Squared: Adjusted R-Squared

GRAPH 7-3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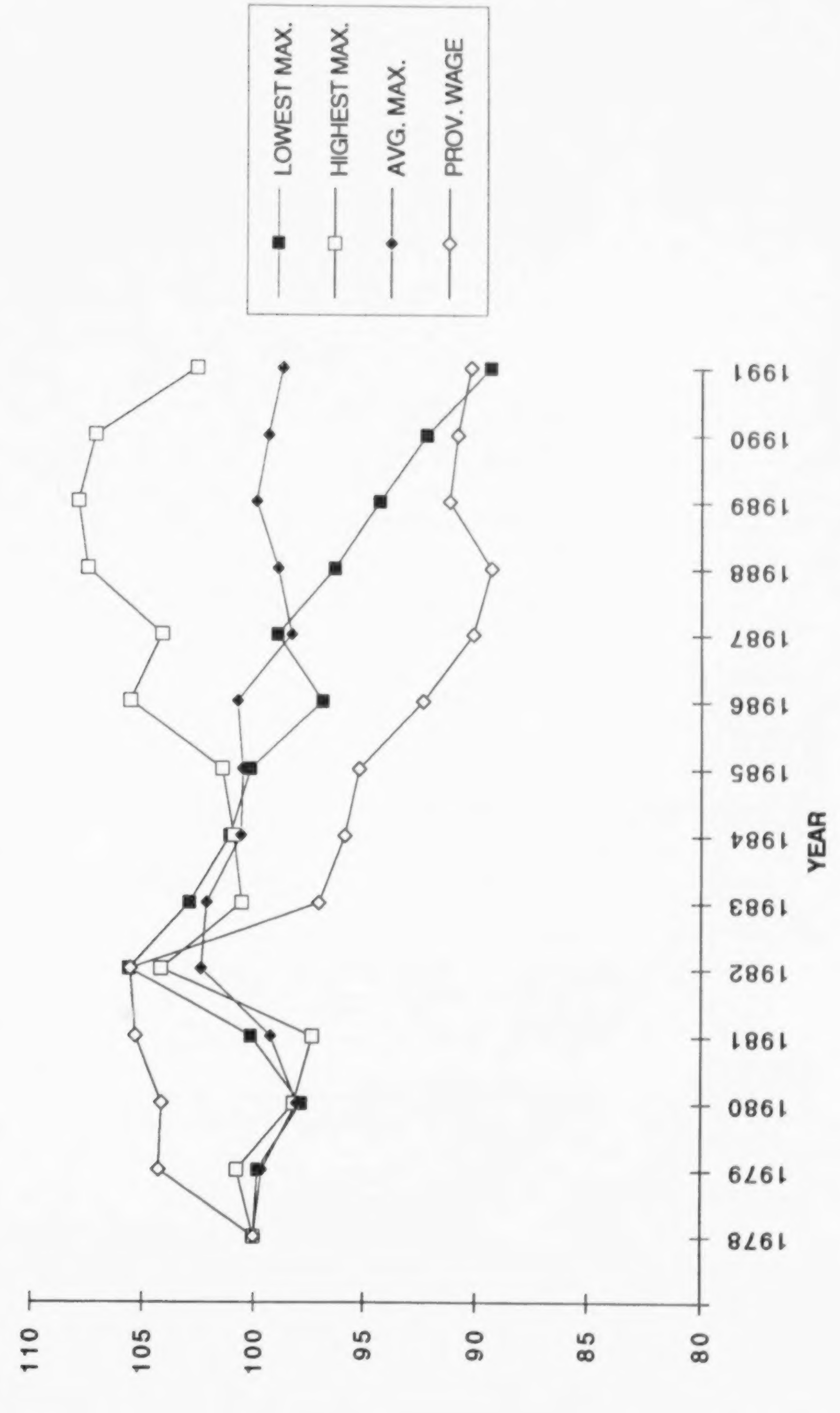
HIGHEST MIN.
AVG. MIN.
PROV. WAGE

GRAPH 7-4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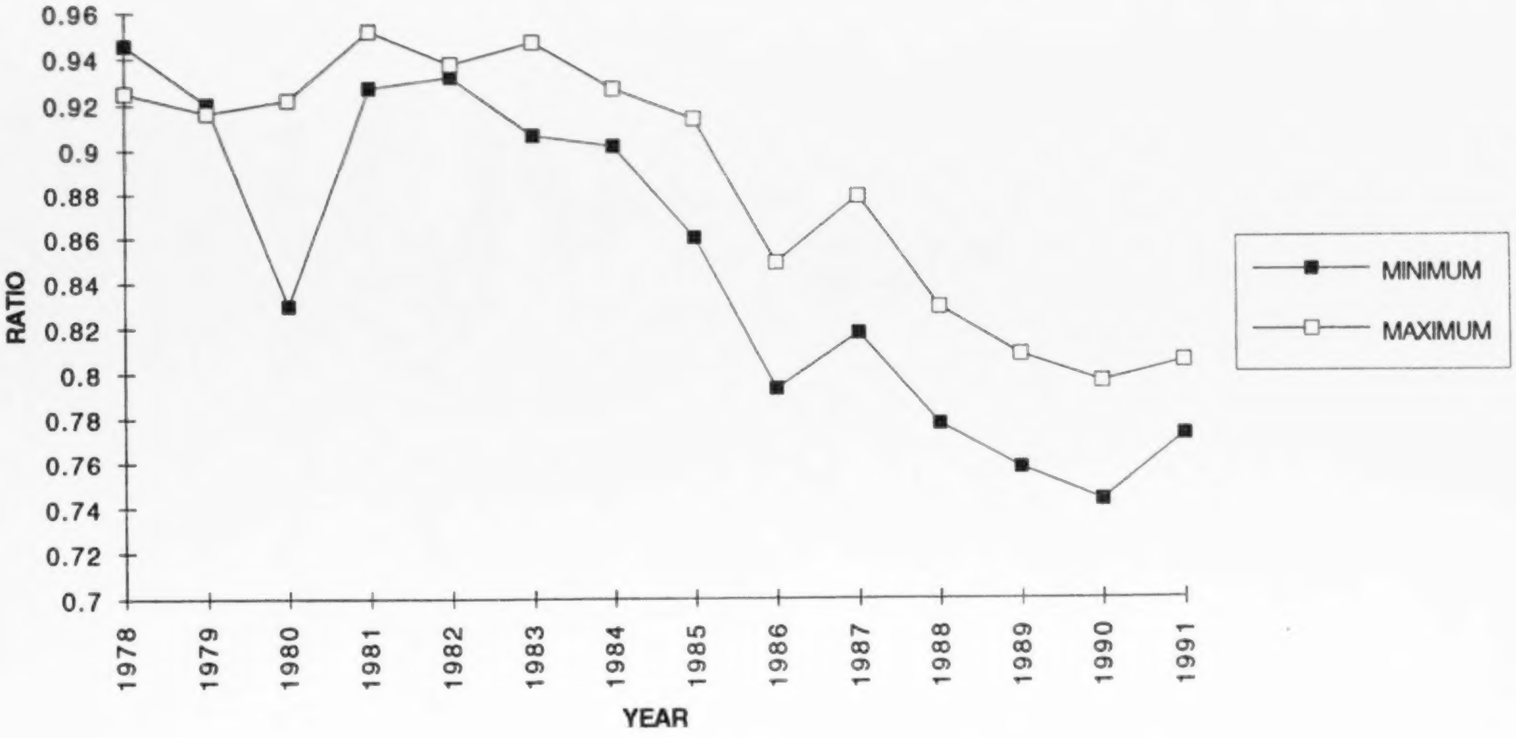
■ LOWEST MAX.
□ HIGHEST MAX.
◆ AVG. MAX.
◇ PROV. WAGE

GRAPH 7-5


0.96
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MAXIMUM

mid 1980s. No longer is there a single driving force determining teachers' pay schedules, that being the rate of inflation. As school boards have been forced to rely more heavily on their own resources, pay rates have become increasingly disparate. There has been a shift in the determinants of teacher pay. The exercise now becomes one of being able to pick up what is differentiating these school boards.

(a) Ability to Pay

With regard to those variables that are related to ability to pay, the regression results are very consistent for the results related to INST (Hypothesis 4--percentage of budget devoted to teaching) and to a lesser degree PROV (Hypothesis 2B-reliance on the Province). The PROV variable is significant (5%) and negative for all three regressions as opposed to SET 1 where PROV was significant in only one regression. This increasing significance of the PROV variable is not surprising.

If one observes Graphs 7-3, 7-4, and 7-5, it can be seen that there is an increasing divergence between the best and worst paid teachers, while the average pay continues to track CPI almost perfectly (previously discussed). School boards, on average, also have become increasingly reliant on their own resources (Graph 7-1) while the extreme pattern bargaining has broken down (Graph 7-5). Of course there are differences in the resources (tax base and ability to cross-substitute) available to each school board, and there may be differences in their willingness to increase local tax rates. For these reasons it is not surprising that the close tracking of the school boards in terms of pay started to break down as school boards were forced to increasingly rely on their own resources.

TAX (Hypothesis 1) continues to be insignificant while the SUP variable reverses sign to become consistent with hypothesis 2A and is significant. It is quite possible that Provincial grants were for the first time an important consideration for wage increases in light of the apparent paradigm shift (i.e., school boards becoming increasingly self reliant and the resultant breakdown in pattern bargaining). The ENROL variable (Hypothesis 3) is not significant in all three regressions which differs slightly from SET 1 where ENROL was significant (5%) when the dependent variable was defined as CMAX. The reason for the change in this variable is unclear.

(b) Willingness to Pay

In the case of the NDP variable (Hypothesis 5: insignificant in all three regressions), a sign reversal occurs and may be due to the fact that the relationship between year and NDP breaks down over this shorter time span (ρ=-0.07 in SET 2 versus ρ=0.23 in SET 1), as province-wide NDP vote was much more stable in percentage terms over this shorter time span.[61] The reduced variance of province-wide NDP vote over this time period may allow the true relationship between these two variables to be measured without any intervening variables distorting the relationship. Nonetheless, these regressions provide no evidence of any relationship between NDP support and wage increases.

(c) General Economic Conditions

Once again the CPI variable (Hypothesis 8) varies positively and significantly (1%) in all three regressions with the dependent variable. CPI was significant in all three equations at the 1% level, and its coefficient averaged 0.4891 over the three regressions. As previously mentioned, this data set starts with the year 1984 and runs to 1991. A serious decline in the size of the regression coefficient could indicate that the influence of CPI was seriously being eroded over time, although it undoubtedly continued to have a serious impact on collective bargaining. Other variables, such as those related to ability to pay, may now be contributing more explanatory power and this may be indicative of the paradigm shift occurring and the breakdown of pattern bargaining.

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[61] In 1979 15.75% of the votes cast in the Alberta provincial election were cast in favour of the NDP. This percentage increased to 18.75% and 29.22% of votes cast in the 1982 and 1986 elections, respectively. This number declined slightly to 26.90% in the 1989 election.

With regard to the other two variables related to general economic conditions, the results are consistent with those from the first set of regressions. The UNEM variable (Hypothesis 7) switches signs but is not significantly different from zero. In both data sets, the UNEM variable does not add anything meaningful to the analysis. In contrast, the PWAGE variable (Hypothesis 6) continues to hold. All three coefficients remain positive and significant (1%).

(d) Productivity

The PTR variable has a negative coefficient in all three regression analysis and it is significant at the 10% level when the dependent variable is CAVG and significant at the 5% level when the dependent variable is CMAX. This runs counter to the expectations of Hypothesis 5 but the results are weak at best. It could be possible that smaller (in terms of enrollment) and dispersed school jurisdictions may not be able to manipulate pupil teacher ratios in any meaningful way over the short term because of their small and dispersed workforces. Another plausible explanation is that increased spending on education went towards both increases in teacher salaries and attempts to reduce pupil teacher ratios during 1984-91.

(e) Work Stoppages

The three strike related variables (STRIKE, PSTRIKE, LENGTH) continue not to be significant (and of a sign counter to that proposed), tentatively suggesting that on average teachers' strikes in Alberta do not elicit wage increases beyond those which other bargaining groups have been able to extract.

(f) Other Issues

With regard to the non-linearity between CPI and wage increases observed in the previous data set, such a relationship does not clearly develop in this data set. This is likely due to the fact that the range of CPI in this data set is much smaller than in SET 1. In the first data set the mean of CAVG was 5.92% (σ^2=4.28) with a range from -0.75% to 21.00% while in the second data set CAVG had a mean of 3.66% (σ^2=2.09) with a range of -0.75% to 11.66%. For this reason any subsequent analysis does not square CPI for this data set.

This regression analysis also suffers from multicollinearity problems, as the eigenvalue ratio is 2131. Table 7-10 provides a principle component analysis for this data. As can be seen, the first principle component is heavily loaded on the macro economic variables and for the previously discussed reasons only CPI is retained.[62]

A second set of regressions was performed with a reduced number of variables.[63] The same variables were dropped from this second set of regressions as were dropped in the previous analysis (see Table 7-11). The eigenvalue ratio dropped to an acceptable 820 and the results were highly consistent with both those of the reduced model from data SET 1 and from the first regressions on SET 2. This stability of results lends some confidence to the results.

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[62] From the interviews it is clear that CPI is the prime determinant of wage increases rather than other economic factors.

[63] As with the last data set, smaller sets of variables were run in order to ensure that their lack of appropriate sign and/or lack of significance was not the result of multicollinearity. This analysis is also done to ensure reliability rather than "improve" the model.

TABLE 7-10

Principle Component Analysis

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5
CPI	0.46	0.07	0.30	-0.07	0.26
ENROL	0.12	-0.05	0.17	0.07	0.27
INST	0.07	-0.08	-0.28	-0.60	0.27
NDP	-0.10	0.10	0.20	0.58	-0.08
PROV	-0.21	-0.05	-0.16	-0.06	-0.26
PTR	-0.01	-0.00	0.53	-0.17	0.02
PWAGE	0.58	0.07	-0.04	0.12	0.03
SUP	0.38	0.05	-0.41	0.28	-0.26
TAX	0.13	-0.01	0.53	-0.11	-0.37
UNEM	-0.46	0.04	0.08	0.04	0.17
STRIKE	-0.03	0.69	-0.03	-0.06	0.02
PSTRIK	-0.03	-0.03	-0.01	0.36	0.68
LENGTH	-0.05	0.69	-0.02	-0.09	0.03

FACTOR	EIGENVAL	% VAR	CUM %
1	2.57	19.7	19.7
2	1.80	13.8	33.6
3	1.25	9.7	43.2
4	1.20	9.2	52.4
5	1.08	8.3	60.8
6	0.99	7.6	68.4

TABLE 7-11

PTR Model (n=666)

Dep. Var.	CAVG	CMIN	CMAX
Intercept	2.623a	2.947a	2.427a
CPI	0.857a	0.836a	0.870a
ENROL	0.001	0.001	0.002
INST	-0.017c	-0.019c	-0.017c
PROV	-0.020a	-0.023a	-0.019a
PTR	-0.024a	-0.021	-0.026a
STRIKE	-0.108	-0.074	-0.130
F-Stat	43.3	38.7	45.0
(Prob.)	0.0001	0.0001	0.0001
R-Squared	0.2826	0.2606	0.2905
AR-Squared	0.2761	0.2539	0.2840

Legend: a-significant at 1%; b-sig. at 5%; c-sig. at 10%.
AR-Squared: Adjusted R-Squared

(4) Pay Constraints: Some Further Evidence

As previously discussed, salary grids are becoming increasingly disparate. In 1978 the ratio for starting salaries (four years of education) from the lowest paid to highest paid teachers was 0.946, while the ratio of the maximum salaries was 0.925. In 1991 these ratios had become 0.772 and 0.806 (see Graph 7-5). Coupled with the fact that the average salaries continued to track CPI almost perfectly, an interesting research question remains: how does one explain the deviations from the average salaries (and CPI) across the province?

In order to deal with this question, the data in the second data set were used in an attempt to identify constraints on wage levels across the province, or in other words identify variables that have differentiated **pay rates or levels** (rather than increases) across the province.[64] The first step was to deflate all wage rates by a CPI deflator so **all wage levels were measured in constant or real dollars.**[65] The second step was to identify those variables that might be related to ability and willingness to pay. Those variables that are immediately obvious are those variables retained in the subsequent regression analysis for both data sets (i.e., the reduced models). These included ENROL, INST, and PROV, which were expected to have a negative impact on wage levels as they are associated with constraints on bargaining. To normalize the PROV variable, it was divided by the average level of reliance on the Province for that given year across all school boards. The reason is to allow for the decreasing reliance on the Province in light of the fact that the average wage across the province has kept up with CPI. In other words, relatively speaking, how much did the school board rely on the Province for its funds? The NDP variable was looked at again to see whether there was an association with higher teacher pay. The PTR variable, as measured as an absolute level rather than changes in PTR as in the previous analyses, was reexamined to determine if teachers are paid for their productivity.

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[64] The second data set also conveniently starts when the pay disparity becomes noticeably large.
[65] The base year was 1984.

Three measures were used for the dependent variable (all in constant dollars): starting salary (four years experience), maximum salary (four years experience), and an average of the two. The average was used in case there were any major differences in the internal distribution of salary grids across the school boards. Results are reported in Table 7-12.[66] F-statistics range from 28.3 to 30.6 (significant at 0.01%) and the adjusted R^2s range from 0.1702 to 0.1821. All coefficients are of the expected sign and significant at the 5% level or better.

The results for INST and PROV are consistent with the previous analysis. Devotion of a larger portion of a school board's budget to teaching and a greater reliance on the Province for funding seems to be strongly associated with a reduced ability to pay. Increasing enrollment (ENROL) also seems to place downward pressure on wage levels. This provides some fairly strong additional evidence to the weak evidence regarding the ENROL variable in the previous analyses.

What is truly interesting in these regression analyses is the coefficients for both NDP and PTR. There most definitely appears to be a strong positive relationship between support for the NDP and higher levels of teacher pay. There also appears to be a pay for productivity aspect to levels of teacher pay. This last point is not irreconcilable with previous results. As mentioned earlier, smaller school boards may have a great deal of difficulty in manipulating pupil teacher ratios in the short term, since shutting down rural schools for efficiency reasons can often meet with a great deal of resistance from parents with children attending the school in question.[67] Over the longer term, school boards may be able to manipulate PTRs in a meaningful way.

The NDP variable may also be reconciled with previous results. This last set of regressions says that NDP vote is associated with higher teacher pay. If these school boards are already paying above average salaries, there may be less pressure to provide large wage increases, which may allow for the significant and negative result associated with changes in the maximum teacher pay in the original analysis.[68] It may also be related to the demographics of the bargaining unit.

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[66] Although not tested for, auto-correlation could be a problem with such data.

[67] This is often related to increased transportation time required when local schools are closed in rural areas.

Overall these results lend further credibility to some of the previous results and provides some evidence to speak to the differentiation of pay across the province.

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[68] The correlation between starting pay level and NDP vote is σ=0.19 which is significant at 0.01%. The correlation between top pay and NDP vote is σ=0.18 which is significant at 0.01%.

TABLE 7-12
Absolute Pay Rates and Explanatory Variables (n=666)

	MIN	MAX	AVG
Intercept	15073a	24059a	19566a
ENROL	-5.12c	-8.67d	-6.89c
INST	-12.23a	-10.15c	-11.19a
PROV	-981.10a	-1206.85a	-1093.97a
NDP	6.21a	6.39c	6.30b
PTR	28.28c	62.22a	45.25a
F-Stat	28.3	30.6	30.2
(prob.)	0.0001	0.0001	0.0001
R-squared	0.1765	0.1883	0.1860
AR-squared	0.1702	0.1821	0.1798

Legend: a-significant at 1%; b-sig. at 5%; c-sig. at 10%.
AR-Squared: Adjusted R-Squared

VIII. Issues and Developments

This study addresses the question of what effect a collective bargaining system based largely on a private-sector model might have when applied to the public-sector, an issue that has been much debated (Kochan and Katz, 1988) but has had little opportunity to be tested--especially for teachers in Canada. This may be due to the fact that public-sector collective bargaining is relatively youthful and is often undertaken within a more conservative legal framework. In contrast with Alberta, many U.S. jurisdictions do not allow public-sector employees to undertake full-blown collective bargaining, and even fewer have the right to strike (Delaney, 1983; Hondale, 1981b; Kochan and Katz, 1988; Lipsky, 1982). During the period of this study (1978-91) the members of the Alberta Teachers' Association operated under a private-sector collective bargaining model with the additional benefit of having a legislated monopoly and closed shop.

The homogeneity of this study's sample controls for public policy and collective bargaining variables that are often tested for in inter-jurisdictional studies and have been found to be significant in determining public-sector pay (Ehrenberg and Goldstein, 1975; Gerhart, 1979; Kleiner and Krider, 1979; Kochan and Wheeler, 1975; Lipsky, 1982; Moore, 1976).[69] Since negotiations are undertaken with a single union (i.e., the ATA) homogeneity of sample also controls for union activity, strength, or other characteristics which could also potentially influence bargaining outcomes (Hondale, 1981a). Non-wage impacts of collective bargaining are also a serious issue, as demands for higher wages may be traded for increases in fringe benefits, and the government sector is well known for having generous fringe benefits (Balfour, 1974; Fogel and Lewin, 1974; Hondale, 1981a; Gunderson and Riddell, 1988; Lewin, 1977; Lipsky, 1982). The homogeneity of the current sample should reduce these variations as interviews with key players have indicated that benefits for teachers in Alberta are highly standardized. These controls should increase the confidence one can place on the results. The one area of neglect is testing and controlling for behavioural issues at the bargaining table (Hammer and Wazeter, 1993). For instance, union and/or management militancy or experience can influence collective bargaining outcomes.

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[69] They also have remained uncontrolled for in many studies.

(1) Longitudinal developments

Wage changes can be subject to a number of random or transient factors or "paradigm shifts" (Lipsky and Dronting, 1973), particularly in the public-sector (Kochan and Katz, 1988). A longitudinal, rather than cross-sectional, study may allow for generalizability of findings over the long term, as periods of economic expansion and retrenchment can affect bargaining outcomes, or allow one to identify changes in bargaining behaviour (Derber and Wagner, 1979; Horton, 1986). One result from analyzing data from a longer period of time is the possible non-linear relationship between CPI and wage increases.

It appears that teachers in Alberta may have fared better versus CPI when CPI was high rather than when CPI was low during 1978-91, a result that runs counter to the literature (e.g., Jenkins, 1985). There is some belief and evidence that unions, and more probably union leaders, have an interest in obtaining relatively stable wage increases (Jenkins, 1985). This may be due to the interest that union leaders have in being seen not to "let down" the membership by agreeing to "relatively" small wage increases when in previous years wage increases were nominally higher. This feeling may exist regardless of the rate of inflation as individuals commonly suffer from money illusion. This non-linear relationship may have been discovered due to the large differences in inflation over this time period (inflation has ranged from high of 12.9% to a low of 2.6%). Having a much lower range of inflation might easily obscure this relationship as was exemplified by the fact that squaring CPI did not help analyses for the second data set which dealt with a much shorter time span and had a much lower range of inflation (inflation ranged from high of 5.9% to a low of 2.6% in the second data set).

Some further evidence of this phenomenon was appearing in 1994. In 1993 inflation ran at 1.8% nationally and by mid-1994 Canada had reached a point of price stability or possibly even deflation, a situation that has not occurred for many decades (Statistics Canada, Publication No. 62-010). Teachers in Alberta were being faced with the choice of wage cutbacks or layoffs in the face of funding cuts and many of the ATA locals had opted for wage cutbacks of up to 5% (Edmonton Journal, April 11, 1994). So at a time of historically low inflation (or possible deflation), teachers were experiencing a drop in **nominal** wages on a large scale, a new development.

What is also interesting is that teacher pay over the entire time period of the study did not, on average, outstrip inflation, as one might have suspected in light of the ATA's relatively enviable bargaining position (i.e., having a statutory monopoly on a public good with a relatively inelastic demand). If the ATA has the power to "milk the public purse," they have not exercised such power, possibly to avoid a public backlash that could crystallize public opinion against the ATA and large wage increases. Some authors have posited that the ultimate constraint on public sector workers is political, rather than financial (Gunderson and Riddell, 1988), or that the demand for certain public services is inelastic only over a "certain range of politically acceptable wages" (Fisher, 1984: 52). This would be somewhat consistent with the paradigm shift observed in the U.S. in the 1970s, if this shift stemmed from a perception that public-sector wages were too high. It is also possible that the existence of a bilateral monopoly may keep both sides in check, with neither party able to exploit their position (Gunderson and Riddell, 1988). School boards must hire ATA members and are unable to replace them when they strike, but ATA members are almost exclusively hired by publicly funded school boards, resulting in a bilateral monopoly.

On the other hand, it appears that teachers have done better than the population as a whole, as average earnings for all workers in the province have slipped behind inflation (see Graphs 8-1 and 8-2).[70] There are two possible explanations for such a phenomena. The first explanation for teachers maintaining their earning power may be that teachers have been shielded from the increased unemployment rates of the general population, and thereby the loss of earning power often associated with periods of higher unemployment (Gunderson and Riddell, 1988).[71] This is evidenced by the lack of (appropriate) significance of the unemployment variable in any of the regression analyses. This would be consistent with the findings of Marciano (1993). When testing the relationship between unionized public-sector wage changes in Alberta and CPI and unemployment, in only two of the eight estimates was unemployment significant, lending some credibility to the notion that public-sector workers are shielded from the general population effects of reduced earnings due to high unemployment.

The second explanation for teachers not being affected by the general unemployment rate is that teachers may be operating in a sub-labour market that has not experienced the same high levels of unemployment. If this is the case then one would not expect teachers to have a decline in real wages.

In light of the 1994 announcement that grants to school boards would be cut by the equivalent of 5% of their total wage bill, a loss of earning power by teachers does not seem out of line with the labour force as a whole, especially if such cuts were done in a selective manner (i.e., cutting more from those school boards that pay teachers more than the provincial average). Unfortunately, from an egalitarian point of view, this is not the case in the short term as funding has been cut uniformly across the province. Teachers, on the other hand, may have the option to force the layoff of

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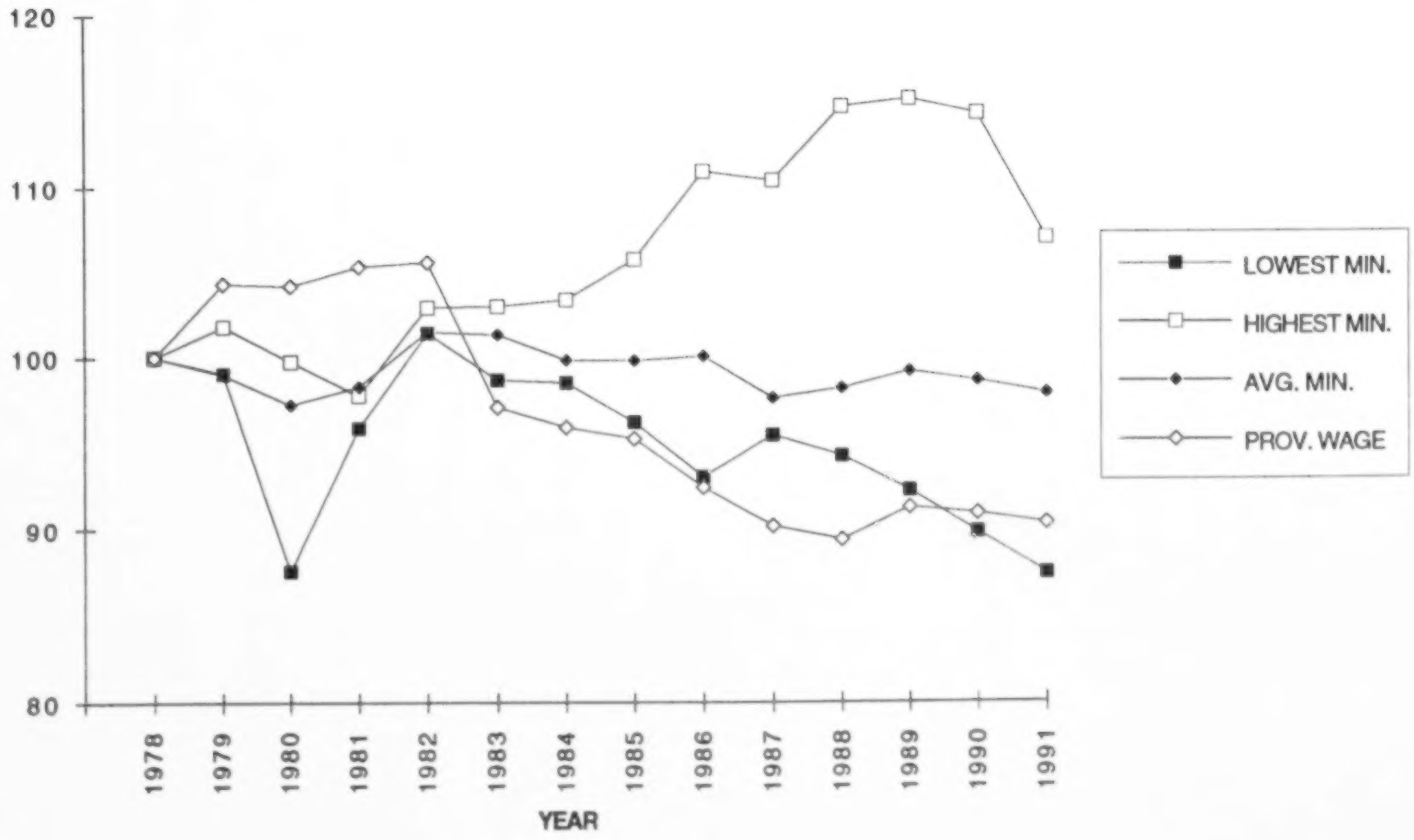
[70] Wage data is gleaned from the Statistics Canada publication Employment, Earnings, and Hours (catalogue No. 72-002).

[71] This may also be the result of the bilateral monopoly.

GRAPH 8-1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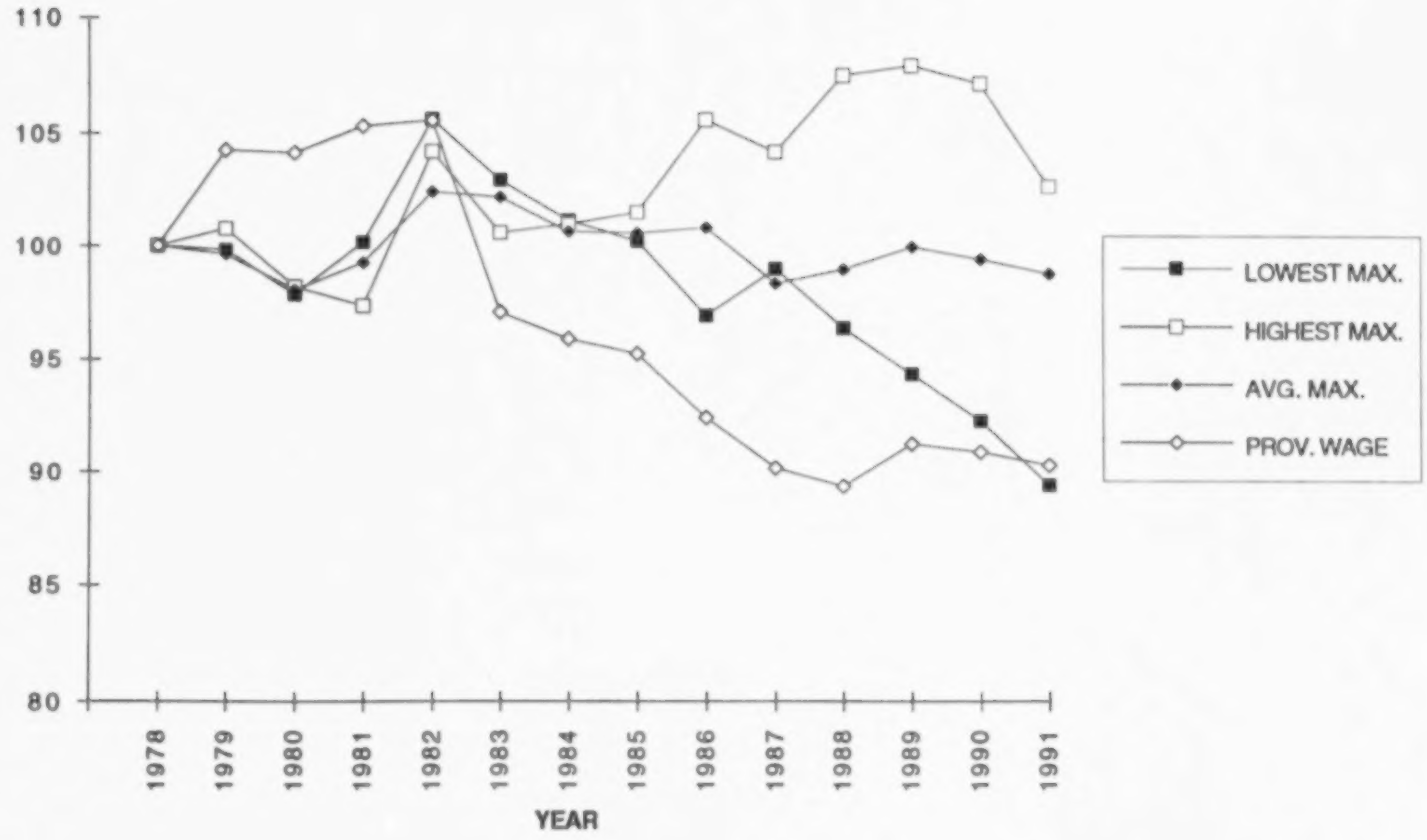
HIGHEST MIN.
AVG. MIN.
PROV. WAGE

GRAPH 8-2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YEAR
LOWEST MAX.
HIGHEST MAX.
AVG. MAX.
PROV. WAGE

more junior teachers. Some school boards have quite explicitly given teachers the choice: accept pay cuts or expect layoffs (Edmonton Journal, January 26, 1994).

A second development discovered by looking at the wage rates over a longer period of time is the increasing disparity of pay among school boards as school boards have assumed a greater portion of overall spending on education. Such a shift in funding sources appears to have distinctly shifted the paradigm under which collective bargaining is undertaken. No longer is the rate of inflation the primary determinant at the collective bargaining table, but it appears that local funding conditions have become more important. This undoubtedly explains the reduced level of R^2s resulting from the second data set and the increasing disparity of pay among school boards.

It seems clear that provincial school boards have substantially different resources at their disposal and a differing ability to move spending from non-instructional to instructional areas. These developments were supported by the last set of regression analyses which showed strong associations between wage levels and reliance on the Province for funding and level of spending devoted to instructional tasks. Left to their own devices it seems probable that teacher pay would become increasingly disparate across the province, assuming school boards continue to be forced to pick up a larger portion of overall spending. It is possible that if this situation became exacerbated, labour strife could set in if those teachers lagging behind the provincial average demanded wage increases to catch up to their provincial counterparts. Such problems could be averted as the Province standardizes funding across Alberta.

The extreme pattern bargaining demonstrated from the start of the study in 1978 until the mid-1980s was breaking down and such situations have lead to labour strife in the past (e.g., longshoring). These factors could have provided some motivation to the Provincial Government in their recent decision to standardize funding to school boards across the province. Standardized funding, though, begs the question as to whether or not the Province should move towards province-wide bargaining to standardize salaries. Having the Province increase its control over teacher bargaining would be consistent with the trend observed across Canada. In 1968 eight of the ten provinces had decentralized bargaining (Muir, 1968). This generally allowed teachers' unions to enjoy an arms length bargaining relationship with provincial governments. With only three provinces currently in such a situation (Downie, 1992) and the Province of British Columbia appearing to be moving to a centralized bargaining structure (Vancouver Sun, March 15, 1994), Alberta may find itself increasingly in the minority if it continues to adhere to its present collective bargaining structure. This nation-wide trend towards centralized bargaining may be the result of previous complaints by provincial governments that they have so little control over teachers' salaries, while teacher salaries consume such a large portion of provincial and municipal spending. Centralizing funding will almost certainly erode some of the distance between the Provincial Government and the ATA.

Standardizing funding will increasingly bind the hands of the school boards in their ability to pay teachers. Under the new grant structure they no longer will simply have the option of raising tax revenue to pay for wage increases possibly increasing the chance of labour strife. Further problems may arise as school boards who spend above the Provincial average deal with a reduction in funding to average levels. To deal with this development, joint budget setting by the ATA and school boards may be an appropriate mechanism through which to avoid labour problems.

(2) Collective Bargaining Constraints

As the school boards have shouldered an increasing portion of the total cost of education, the relative disparity in pay across the province has increased as school boards have been forced to rely on their very different resources to finance increases in spending. Looking across all regression results, there is evidence that there is a strong relationship between wages and wage increases and reliance on the provincial government for funds and percentage of budget devoted to instructional tasks. Hypotheses regarding support for the NDP, pupil teacher ratios, and changes in enrollment were only supported in the last set of regression analyses.

If one accepts that wage increases have not been influenced by work stoppages, then it becomes clear that whether teachers take a pay cut or whether school boards will be forced to increase pupil teacher ratios to deal with the loss of funding (or some combination of the two) will remain an almost exclusive choice of the ATA, particularly in light of the fact that many school boards have explictly indicated this (Edmonton Journal, January 26, 1994). The evidence that there is a pay for productivity element for teachers across the province will presumably become more pronounced as pay is cut or the number of students in the classroom is increased. In other words, pay should become increasingly differentiated by pupil teacher ratios.

There is already some evidence that these processes are starting to take shape as the school boards and the ATA struggle with the spending reductions imposed in 1994. If one were to continue the analysis into 1994, it is likely that the relationship between levels of teacher pay, devotion of budget to instructional tasks, and pupil teacher ratios, would become even stronger. With school boards about to lose the right to levy their own taxes, they will either have to reallocate budgets internally, raise pupil teacher ratios, or reduce salaries. In evidence, teachers at both Edmonton's Catholic and Public School Boards recently took wage rollbacks in order to save jobs (Edmonton Journal, April 11, 1994; Edmonton Journal, April 12, 1994).

The need to reduce the total wage bill may vary across school boards, as there is evidence that those school boards that have a larger portion of their budget devoted to non-instructional tasks may be able to strip some non-instructional areas in order to obtain more funds for wages, potentially at the behest of the unions themselves. The school boards and the ATA may move to the collective bargaining model described by Craft (1970) where teachers and school boards jointly combed budgets for "misallocations" of funds in order to provide more money for teacher's salaries. The first inkling of such a process occurred as the ATA local that bargains with the Edmonton Public School Board passed a resolution calling for the school board to cut a further $10 million from central administration, in addition to the $5 million already cut, to deal with the loss of Provincial funding (Edmonton Journal, April 13, 1994).

As an added twist, the Province intends to standardize per student funding across the province (Edmonton Journal, January 19, 1994), which could also increase labour problems if bargaining is not centralized. This is because spending per student varies greatly. Those that have been spending below average amounts on their students will likely have a much easier time funding wage increases than those school boards that spend above the provincial average and therefore will find themselves burdened with relatively severe funding cuts. There may easily be winners and losers in the process, possibly exacerbating labour discord that already exists. As mentioned, this may encourage the Alberta government to impose province-wide bargaining to standardize salaries in light of standardized funding.

(3) NDP Support and Public-Sector Unions

The relationship between support for the NDP and rates of teacher pay and increases in teacher pay have some very interesting implications. It should be noted that this variable is exploratory. Little investigation has been done into the relationship between NDP vote and public-sector pay. The variable may be considered a link between public-sector pay and the NDP or it may provide a general barometer of community attitudes.

Although one might look at the various results and find them highly contradictory, this may not be so. First, from Table 7-12 it seems clear that there is a strong relationship between NDP support and absolute levels of teacher pay. One might look at the initial regression results and feel that they are somewhat contradictory to the significant negative results in the first data set where the dependent variable was defined as changes in maximum teacher pay. There are three plausible explanations to this potentially contradictory result.

The first is that if teachers' wages were found to be relatively high in areas of high NDP support (as evidenced in Table 7-12), there will be a reduced need to increase teacher pay to keep up with teachers across the rest of the province. The second is the fact that because the NDP variable was only significant (and negative) for the top paid individuals, it may be that there is less sympathy for teachers at the top of the pay scale who do very well versus the population at large, receiving almost double the average provincial wage. This would be consistent with socialist beliefs in reducing pay disparity. The third is that these two results are consistent with a more egalitarian wage structure, that being a more compressed wage scale. If one checks the correlation between NDP vote and the ratio of top to starting pay for each school board, the correlation is negative and significant ($\rho=-.13$, significant at 0.01%), indicating that pay scales are relatively more compressed where NDP support is high. This is also consistent with a theme of reduced pay disparity.

Although not considered at the start of this project, these findings with regards to NDP vote are highly interesting. It confirms the general association between public-sector pay and NDP support, yet puts something of an egalitarian spin on the results. Further research into this question would be of great interest.

(4) Alternate Dispute Resolution

There appears to be no evidence that bargaining outcomes deviate from the norm where work stoppages occur. This raises an interesting public policy question: should teachers continue to enjoy the right to strike? Without knowing what the bargaining positions of the parties were immediately prior to a strike, it is impossible to tell which parties to collective bargaining altered their bargaining expectations in order to reach an agreement. What seems to be obvious is the fact that teachers have not been able to (or cared to) use their positions to "milk the system" as Wellington and Winter (1969, 1970) might have us believe, although one must remember that they have been shielded from the general downward pressure placed on wages during times of high unemployment. What the lack of significance of these variables does tell us is that whoever attempted to alter bargaining outcomes from prior norms established province-wide may have been expending energy without return.

This could suggest that the Government of Alberta may be able to impose binding arbitration without having any major impact on collective bargaining outcomes. Arbitrators are known for their affinity for making settlements within established norms. Due to the large number of agreements signed every year between school boards and the ATA (approximately 45), established norms become quite clear. If one can accept the fact that work stoppages do not affect bargaining outcomes and that established norms are easily determined, it may be in everyone's best interest to change governing legislation to remove the right to strike and replace it with binding arbitration.[72] This of course would allow teachers to continue to draw their salaries while allowing children to remain in school. This would also minimize the general disruption of the workforce that occurs due to the increasing incidence of two-income and single parent families.

There are some possible drawbacks to such a proposal, though. It has been suggested that collective bargaining would change entirely in the absence of economic sanctions (Leap, 1991), possibly even debilitating the process entirely (Fisher, 1980; Williams, 1973). Without a strike or lockout option, the parties to collective bargaining may not have any method to vent their frustrations, one of the many functions of a work stoppage. In addition, without the legal right to strike, illegal strikes may occur which could have far more serious repercussions than legal strikes. Employers or unions representing workers in essential public services may question the impartiality of an arbitrator, especially where arbitration is mandatory (Fisher, 1980, 1984). Also, employers or unions are less inclined to adhere to imposed agreements rather than negotiated agreements (Fisher and Kondra, 1993). Even if the right to strike is to remain, voluntarily agreeing to binding arbitration may be appropriate for the parties.[73] Neither side may risk a "loss."

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[72] It could be argued that the provincial government imposed either one of two choices with their 1994 grant cut: job losses or wage rollbacks.

(5) "Concession Bargaining"

Teachers have not been subjected to pay cuts over the period of this study but in many instances they have been subjected to pay freezes.[74] As concession bargaining is a relative concept, historically a wage freeze appears to be a concession for the ATA. With this in mind, it is not surprising that the models overestimated wage freezes and near freezes, as Kochan and Katz (1988) have posited. This finding is merely confirmatory rather than surprising. What is also known is that members of the ATA will for the first time since the removal of wage and price controls in 1978 undergo widespread loss of earning power.

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[73] Such an option currently exists under the Province's Labour Relations Code.

[74] Only two of the 2068 measures of the dependent variable were negative.

IX. Conclusion

Overall this study should provide some insight into public-sector collective bargaining within a predominantly private-sector framework. It also marks (1) the first Canadian econometric study on the determinants of teacher pay and (2) the first longitudinal study to use more than five years of data. Careful control of relevant variables through (1) homogeneity of sample or (2) inclusion in regression analyses should help reduce or eliminate uncontrolled for effects (e.g., regional labour market conditions and collective bargaining strength), lending greater credibility to the results of this study.

Many findings of the study were highly interesting. Probably the most important finding of the lot is the apparent paradigm shift. From inflation being almost the sole determinant of teacher raises, the wage determination paradigm has shifted to one that reflects more of an ability to pay situation with each school board. A paradigm shift occurred in the 1970s in the United States for the public-sector (Kochan and Katz, 1988). This is interesting because it seems that the study has identified some constraints on wage increases for teachers, a situation some have argued would not exist (Wellington and Winter, 1969, 1970). The paradigm shift to an ability to pay model (rather than inflation based model), the apparent breakdown in pattern bargaining, and each school board's assuming a larger portion of total spending all appear more or less concurrently in the mid-1980s. What is also likely coming to fruition is another paradigm shift as the Province changes the nature of school grants and the taxation system. Although it is far from clear exactly what the final impact of these changes will be, the repercussion could be serious.

With regard to wage increases versus inflation, although the evidence is not overwhelming, teachers appear to lag inflation when it is low and lead inflation when it is high, and this appears to be occurring in 1994. This, as mentioned, runs contrary to current literature, raising a serious issue for future research. Is this finding unique or does a large number of unions follow this pattern? What should also be carefully looked at is whether or not this finding is a result of the fact that this study was conducted on a public-sector union or a public-sector union governed by private-sector legislation. It could also be peculiar to the time period studied. It could be that private-sector unions have much more stable wage gains than those in the public-sector. Further research into this area may also be in order. It is also of import to note that, on average, teachers in Alberta during 1978-91 have not seen their wages outstrip inflation as has been suggested in the past about public-sector unions. On the other hand, they have not experienced the same real decline in wages that the population as a whole have suffered from during the 1980s.

The findings with regards to the NDP variable were also of great interest. It appears that there is a relationship between support for Canada's "labour" party and teacher pay, a finding that many would argue is not surprising. What is particularly interesting, though, is the possible discovery of a relationship between wage compression and support for the NDP. This may be an important direction for future research. Further investigation into whether wage compression and high support for the NDP (or possibly the Liberal party in some jurisdictions) is related to wage compression should be conducted.

Some of the other less important findings include the lack of significance of the work stoppage variables, the potential for the substitution of alternate dispute resolution for work stoppages, and the possible need for province-wide bargaining in light of changing grant structures.

Applicability of findings from one jurisdiction to another (external validity) is a serious and ongoing theoretical and research question (Kochan and Katz, 1988). For example, differences in the calculation of transfer payments among jurisdictions in the United States and Canada may alter findings substantially. U.S. educational transfer payments are often inversely related to wealth of the receiving district (Balfour, 1974;

Kleiner and Krider, 1979), while education funding is more likely to be provided on a per capita basis in Canada. In addition, there is not the checkerboard nature of collective bargaining in Canada, and results from this study may only be generalizable to Ontario, Manitoba, and British Columbia, where collective bargaining is undertaken at the school board level under a private-sector model of collective bargaining (Downie, 1992).

Overall this study has leant some credibility to the notion that collective bargaining is a workable method for public-sector representation even under a private-sector model of collective bargaining, contrary to the beliefs of many. The ATA has either been unwilling or unable to "milk the public purse," strikes have been relatively infrequent, and such strikes have not resulted in abnormally large wage increases. With the empirical evidence that ability to pay is now a driving force and the fact that the ATA appears to be willing to absorb wage cuts in line with the population as a whole, the ATA could continue to be an equitable and valuable representation tool for the Alberta's teachers.

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